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Attraction of *Gabonia* and *Nzerekorena* to pyrrolizidine alkaloids – with descriptions of 13 new species and notes on male structural peculiarities

(Insecta, Coleoptera, Chrysomelidae, Alticinae)

Gerhard Scherer and **Michael Boppré**

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Baits containing pyrrolizidine alkaloids (PAs) attracted 17 species of *Gabonia* and 1 of *Nzerekorena* in Kenya, East Africa. In *Gabonia* attraction is strongly male-biased (>2600♂♂ vs 27♀♀). Attempts to discover the beetles' host plants were unsuccessful, but hosts of several other coleoptera were recorded, including that of one *Gabonia* species not attracted to PAs. In addition to field observations, the paper provides descriptions of 13 new species (12 *Gabonia* and 1 *Nzerekorena*), keys to the species, and a morphological characterization of peculiar structures in males.

Dr. Gerhard Scherer, Zoologische Staatssammlung München, Münchhausenstraße 21, D-81247 München, Germany.

Prof. Dr. Michael Boppré, Forstzoologisches Institut der Universität Freiburg i. Br., Fohrenbühl 27, D-79252 Stegen-Wittental, Germany.

Introduction

Males of *Gabonia gabriela* Scherer have been reported to visit withered plants of *Heliotropium* (Boraginaceae), apparently in order to gather pyrrolizidine alkaloids (PAs) (Boppré & Scherer 1981). This finding has been confirmed and augmented during more recent field studies in Kenya, when pure PAs were used as baits. Moreover, 16 other *Gabonia* and 1 *Nzerekorena*, including 12 undescribed species, were found to exhibit similar behaviour. In order to supply a basis for further studies, we here describe the new species and report on the field observations, some feeding experiments as well as on some other Coleoptera found on PA-containing plants. Also, an account of surface fine structure for certain male characters is given for several *Gabonia* species. To date, the life history of these Alticinae is still dubious but from a comparative point of view they contribute to the understanding of pharmacophagous utilization of pyrrolizidine alkaloids, a feature which they share with various other insect groups (cf. Boppré 1986, 1990, and Discussion).

Material and Methods

Fig. 1

Plastic dishes (95 × 70 × 12 mm), usually containing 50, 100 or 200 mg of PAs extracted and purified from seeds of *Crotalaria scassellatii* Chiov. ("PA-extract"; major PA: axillaridine, Wiedenfeld et al. 1985, cf.

Boppré in prep.), were put out opportunistically in various habitats in the course of studies on Lepidoptera. The dishes were placed either on the ground, or on fallen trees up to a height of 80 cm. In addition, dishes with 50 mg of other PAs or PA N-oxides, and/or withered plant parts of *Heliotropium pectinatum* Vaupel in nylon-gauze bags, were sometimes used. Beetles attracted to any such baits were collected and analysed for species and sex.

Repeatedly, scrub, plants and trees of the baiting areas as well as all kinds of flowers were searched for *Gabonia*. With *G. gabriela* Scherer and *G. bicolor*, spec. nov. simple, preliminary feeding tests were made in confinement. We placed 5-15 beetles in clear plastic containers and offered leaves and seeds, respectively, of a variety of plant species, to see which plants were eaten and to study individual survival.

The field studies were conducted in Kenya, East Africa, mainly in the following habitats:

- Kakamega Forest, 1500 m, 35°E, 2°S: patches of moist primary forest of medium altitude type interspersed with cultivation;
- Maragoli, 35°7'E, Equator: cultivated land;
- Shimba Hills National Reserve and vicinity, Kwale District, up to 500 m, 39°30'E, 4°10' to 4°20'S: planted forest and grassland with patches of primary costal forest, 5 miles inland;
- Jadini Forest and vicinity: 39°6'E, 4°5'S, coastal scrub and forest with adjacent cultivation, near sea shore.

Beetles were preserved in the field in 70 % ethanol and later mounted and air-dried for taxonomic study.

Voucher material has been deposited at the National Museum, Nairobi, at the Zoologische Staatssammlung München, at The Natural History Museum, London, and in M. Boppré's collection. All holotypes are in the collection of the National Museum, Nairobi. Except otherwise stated, paratypes have been equally divided between the four collections mentioned above.

During the course of this study, type material of the following nominal species has been examined:

Gabonia: *carinulata* Bech., *citri* (Lab.), *coffeae* (Lab.), *colae* (Bryant), *crenicornis* Bech., *ganganensis* Bech., *impressipennis* Lab., *latimana* Lab., *lutea* Scherer, *malacorhinoides* Bech., *montivaga* Bryant, *nasalis* Bech., *punctipennis* (Lab.), *sexualis* Bech., *sheppardi* (Jac.), *tricolorata* Lab., *variola* Bech.

Nzerekorena: *basilewskyi* Scherer, *carinulata* Bech., *cerambycina* Bech., *clypeata* Bech., *foveolata* Bech., *garambaensis* Scherer, *macrophthalma* Bech.

Results

Baiting tests

Withered material of *Heliotropium pectinatum* and dishes containing PA-extract strongly attracted *Gabonia*. Other attractive PAs included monocrotaline, but dishes containing, for example, heliotrine or PA N-oxides failed to lure beetles (cf. Discussion). How many beetles visited a given bait varied not only according to species, habitat and season, but also to wind conditions and competition with natural sources of PAs etc. in the baiting areas (cf. Discussion); at best, after dusk a single bait lured about 100 *G. gabriela* within 45 mins. For several species attraction to baits appears to be correlated with the time of day (and/or the temperature conditions), however, data available are not sufficient for a final statement. Data of continuous collection from 7a.m. to 8p.m. demonstrate, at least, that baits attract specimens at any time. As previously reported for *G. gabriela* (Boppré & Scherer 1981), other *Gabonia* visiting PA-sources at night also usually jump off the bait if illuminated with a torch light. In confinement, however, the beetles exhibit a strong positive phototactic response.

Observations of beetles arriving at a bait revealed that the insects approached from upwind, usually settled about 10 cm away from the bait, and eventually continued their flight directly to the bait; sometimes they circled above the bait for a minute or so; intermediate stops on their way to the bait were frequently observed, too. Although no marking experiments were carried out, it was obvious that the beetles usually remained at a bait for extensive periods. Several times it was observed that species attracted at night were present on the bait the following day, even during light hours. A total of >2600 *Gabonia* specimens was collected at PA baits and analysed. The actual number of beetles observed at baits was much higher, but it was judged unnecessary to take all individuals of the most common and easily recognizable species (particularly *gabriela*, *gabrieletta*, and *bicolor*), especially when sample sizes were high.

Fig. 1. *Gabonia gabriela* at dish containing pyrolizidine alkaloids (Shimba Hills).

The baited material consists of 17 *Gabonia* species, including 11 previously undescribed ones. Of 11 spp. (*bicaveata*, spec. nov., *carinulata*, *cavipennis*, spec. nov., *fulvicornis*, spec. nov., *fuscitarsis*, spec. nov., *gabriela*, *gabrieletta*, spec. nov., *impressipennis*, *latimana*, *nigroapicalis*, spec. nov., *punctipennis*) the baits attracted males exclusively, of 6 spp. (*bicolor*, spec. nov., *colae*, *foraminipennis*, spec. nov., *picea*, spec. nov., *rubropicea*, spec. nov., *tibialis*, spec. nov.) a few females were caught; without counting *G. rubropicea*, spec. nov. (>700♂♂ vs 20♀♀) there are >1.900♂♂ vs 7♀♀. Males of the species occurring in the Shimba Hills were not only found at baits but also at flowers of PA-plants. Details are given in the bionomics paragraphs within the taxonomy chapter.

25 specimens of one *Nzerekorena* species only were found at PA baits; attraction of this species appears not to be sex-biased (14♂♂ vs 11♀♀).

Baited beetles included further species of *Gabonia* as well as of other genera; since they occurred in very small numbers, they are neglected in the following.

Further records and observations

Gabonia-visiting flowers

Occasionally, males of *G. gabriela* and *G. colae* were seen during day-time at flowers of *Heliotropium pectinatum* and at night at damaged leaves of this plant; other *Gabonia* species did not occur in the habitat of this plant. (The flea beetles *Longitarsus gossypii* Bryant live on *H. pectinatum* and chew holes in the leaves, which then become attractive to Danainae; these butterflies use their legs to scratch at the holes and damage the plant tissues further to gather PAs: Boppré 1983.) Several males of *G. cavipennis*, *colae*, *gabriela*, *picea*, and *rubropicea* were collected from withering flowers of *Ageratum conyzoides* L. and from flowers of *Gynura scandens* O. Hoffm. It seems that if *Gynura* is flowering, all *Gabonia* spp. occurring in the same habitat can be found at its flowers (cf. Discussion).

Host plants of *Gabonia*

Because the host plants of *Gabonia* spp. are unknown (see Discussion), we searched extensively for the beetles at plants, particularly when baiting indicated a high population density. Despite intensive efforts, no host plant of any of the species lured to PA-baits could be found.

In the Shimba Hills, we met both sexes of *Gabonia compressicornis*, spec. nov. in abundance on *Vangueria tomentosa* Hochst. (Rubiaceae; not a recognized PA-containing plant); this species, however, never visited our baits. On *V. tomentosa* we also recorded the only 2 females of *gabriela* ever found, 1 male *gabriela* plus several other Coleoptera.

Feeding tests with *Gabonia* in confinement

In order to find out about foodplants of *Gabonia*, specimens of *gabriela*, *bicolor* and *rubropicea* collected at PA-baits (i.e. males only) were offered leaves of a variety of plants from the baiting area. The beetles refused to feed on any of these plants except *Gynura scandens*, *Heliotorpium* spp. and *Crotalaria* spp., all of which contain PAs. The beetles chewed holes in the leaves of these plants. Roots of *Heliotropium pectinatum* and seeds (split into halves) of *Cortalaria* spp. were particularly well liked (cf. below). In this context it should be noted that defensive froth from *Rhodogastria* spp. (Lepidoptera: Arctiidae), which is rich in PA N-oxides if the adults have gathered PAs (Boppré & Wiedenfeld unpubl.), stimulated feeding in *Gabonia*: filter paper partly soaked with froth attracted the beetles, which then applied their mouthparts to the contaminated spots (Fig. 1b). Where the beetles apparently fed, the colour changed from yellowish to pink, which might indicate that they regurgitated fluid in order to dissolve PAs, as do Lepidoptera. Dead *Rhodogastria* moths which had had previously access to PAs were also attractive. In confinement, the beetles lived for only 1-2 days, probably because of starvation. With access to unripe seeds of *Crotalaria scassellatii* cut into pieces, they lived, however, up to 5 days.

Coleoptera found at living PA-containing plants

In the following we note species of Coleoptera which we found at living (intact) PA-containing plants. Some males of *G. gabriela*, *G. rubropicea* and some *Longitarsus* (plus unidentified Histeridae and Hydrophilidae) were found at living leaves and flowers of a *Crotalaria* sp. in the Shimba Hills.

Several *Longitarsus* sp. were encountered at living *Heliotropium pectinatum* Vaupel near Samburu (Coast Province) but no baiting tests could be conducted in this area.

Both sexes of *Longitarsus gossypii* Bryant were found in large numbers at *Heliotropium studneri* Vatke, *H. pectinatum* Vaupel and *H. gorinii* Chiouvenda; the beetles cause heavy damage by perforating the leaves.

In flowers of *Crotalaria scassellatii* Chiouv. (Fabaceae), Histeridae were found, and in seed pods of *Crotalaria* sp. larvae of bruchids were common.

Taxonomic account and descriptions of new species

The *Gabonia*-complex and the genera *Gabonia* and *Nzerekorena*

The genus *Gabonia* Jacoby, 1893 (1895) is restricted to the Afro-tropical region and presently comprises 141 valid species and 4 subspecies (Scherer unpubl.).

The complex of genera near *Gabonia* (Scherer 1961) is not well understood. In the system of Alticinae they are considered as sister-group of the subfamily Galerucinae beside *Luperomorpha* Weise, 1887 with its Afro-oriental distribution. They share high anterior coxae which are very closely approaching each other and are open behind; body moderately vaulted and longitudinal in shape, anterior angles of pronotum not beveled, no groove-like impression parallel to base of pronotum; upper side of tibiae rounded and not channelled; elytral punctures not arranged in 9 complete rows.

The *Gabonia*-complex separates from *Luperomorpha* and all others with its typical hind-tibial spur which is comparatively long, above all very typical straight. A further character considered to be typical for *Gabonia* is the short 3rd antennal segment which is as long or often shorter than the 2nd segment. In *Decaria* Weise, 1895 which resembles *Gabonia* in all other characters, the third antennite is lost (i.e. the antennae have only ten segments). *Gabonia* and *Decaria* are definitely very closely related; separating these genera on the basis of this single character is most weakly justified particularly since there is *G. atrophica* Bechyné, 1959 with an atrophied 3rd antennal segment. *Nzerekorena* Bechyné, 1955, *Upem-*

baltica Bechyné, 1960, *Kanonga* Bechyne, 1960, *Dimonikaea* Bechyné, 1968 are close to *Nzerekorena* but separated with respect to the shape of the antennites. *Malvernia* Jacoby, 1899, a *Gabonia*-like genus, is characterized by its antennal segments 8-10 which are roundish and short, its 3rd antennite is somewhat longer than 2nd.

Compared to *Gabonia*, species of *Nzerekorena* share the following characters: frons more or less plane or concave and – caused by the long genae – broad and rectangular; antennal calli very transverse and head behind them very short; along with these characters there is a half-moon-like impression in front of the base of the pronotum, which can be devided in the middle in an impression on each side of the pronotum; antennae are conspicuously long and filiform; all species have elytra with distinct basal calli and punctation in very narrow longitudinal rows. All other features are as in *Gabonia*. Pronotal and elytral characters as in *Nzerekorena* can be found in *Gabonia*, too; however, no *Gabonia* exhibits the peculiar shape of the head.

The species groups of *Gabonia*

As shown below, many species of *Gabonia* exhibit in the male sex secondary characters suited to establish species groups. Species around *latimana*, *coffeae*, and *rubropicea* require further study to recognize relationships. Arranging the *Gabonia* species treated in this paper as well as their known close relatives into groups is to facilitate identification and indicate relationships between species. While the males of many *Gabonia* exhibit structural peculiarities which support such grouping, females are not only difficult to identify but also difficult to associate with the males.

When appropriate we provide keys to the members of species groups to demonstrate those characters separating the species. A key to identify species recorded as visiting PA-sources in Kenya is given below.

Key to the *Gabonia* species groups treated in this paper

A) Sexes dimorphic, males characterized by conspicuous structures:

- First tarsal segment of fore-legs distinctly broader (1.3-1.5 ×) than apex of tibia; 2nd segment tiny, about half as broad as 1st segment .... *G. latimana*-group
- Hook-like structures on hind tibiae .... *G. colae*-group
- Serrate ridge on antennae .... *G. crenicornis*-group
- Various antennites enlarged and unusually shaped .... *G. gabriela*-group
- Depressions on elytral tips .... *G. pustulatipennis*-group
- Depressions on elytral sides behind humeral calli, elytra broadened from base up this point .... *G. bifoveolata*-group

B) Sexes similar:

- Length about 4 mm, colour reddish-brown .... *G. coffeae*-group
- Length 2.28-2.80 mm, colour dark-brown .... *G. rubropicea*-group

Gabonia latimana-group

This group comprises those species of which the males have their first tarsal segments of the fore-legs distinctly broader than apex of respective tibiae (1/3-1/2) and second segment tiny, about half as broad as first segment (cf. figs 2-4). In all other *Gabonia* species the first tarsal segment of the fore-legs is about as broad as the apex of the respective tibia, and the second segment is almost as wide as the first segment. The *Gabonia latimana*-group comprises the following species: *impressipennis* Laboissiere, 1942, *latimana* Laboissière, 1942, *mala* Bechyné, 1959, *platypoda* Bechyné, 1968, *punctipennis* (Laboissière, 1939), and *sexualis* Bechyné, 1960.

Gabonia impressipennis Laboissière
Fig. 2

Gabonia impressipennis Laboissière, 1942: 31.

Holotype: ♂, Zaire: Nyongera, près Rutshuru: Butumba (Tervuren) (examined).

Distribution. Zaire: Rutshuru (Laboissière 1942); Uele, Haut-Uele, (Mongbwalu) (Scherer 1962b); Côte d'Ivoire (Scherer 1969).

Distribution and bionomics in Kenya. Kakamega Forest: >47♂♂, no ♀, at PA-baits only; IV/84, V/84, IX/85, VI/86, III/88, V/88.

Gabonia latimana Laboissière
Fig. 3

Gabonia latimana Laboissière, 1942: 30.

Holotype: ♂, Zaire: Rutshuru (Tervuren) (examined).

Distribution and bionomics in Kenya. Kakamega Forest: >25♂♂, no ♀, at PA-baits only; IV/84, V/84, IX/85, VI/86.

This species is geographically variable, particularly with respect to the pronotum; in specimens from the type-locality it is wide but in those from Lukuga narrow, while it is intermediate in examples from Kakamega.

Gabonia punctipennis (Laboissière)
Fig. 4

Jamesonia punctipennis Laboissière, 1939: 403.
Gabonia punctipennis, Laboissière 1942: 31.

Holotype: ♂, Zaire: Haut-Uelé: Abimva (Tervuren) (examined).

Distribution. Zaire: Haute-Uele (Laboissière 1939); Kivu (Scherer 1962b).

Distribution and bionomics in Kenya. Kakamega forest: >70♂♂, no ♀, at PA-baits only; V/84, VIII/85, IX/85, VI/86, XI/86, IV/87, V/87, IX/87, XII/87, III/88, V/88.

In contrast to specimens from Zaire in those from Kakamega the pronotum is less vaulted near the base and the pronotal depression is more strongly developed. The eyes are larger and the eye diameter is as great or even greater than the width of the frons. Most individuals are reddish- or yellowish-brown with even brighter pronotum and frons, only a few have dark-brown elytra as the Zaire specimens. Some individuals resemble *G. sexualis* Bechyné.

Gabonia colae-group

This group comprises those species in which the males possess a hook-like structure on the upper side of the hind tibiae (cf. figs 5-8).

Key to species with a hook-like structure on hind tibiae

1. Head, pronotum reddish-brown, elytra dark-brown .... *G. bicolor*, spec. nov.
– Head, pronotum and elytra reddish-brown .... 2.

2. Sides of pronotum rounded .... 3.
– Sides of pronotum straight .... *G. tibialis*, spec. nov.

3. Frons distinctly narrower than eye diameter, 3 mm long. Distribution: Zaire: Upemba Park .... *G. fracta* Bechyné
– Frons somewhat broader than eye diameter, 2.36-2.56 mm long .... *G. colae* (Bryant, 1944/45)

Gabonia colae (Bryant)

Figs 5, 6, 23, 38

Jamesonia colae Bryant, 1944/45: 824.
Gabonia colae, Bechyné 1955b: 502.

Holotype: ♂, Sierra Leone: Njala (Brit. Mus. Nat. Hist.) (examined). – Allotype: ♀, Kenya: Jadini Forest, 06.07.1986 (National Museum Nairobi).

Description of female. It lacks the hook-like structure on hind tibiae, which is conspicuous in males, antennae are more slender, eyes are less convex, fore-tarsi are somewhat narrower than respective tibiae. All other characters are as in males. In the spermatheca (Fig. 38) of the only *colae* female available, the ductus is leading off the spermatheca and is thus not straightly opposed to the final capsule as is the case in all other species examined.
Male. Aedeagus (Fig. 23), for the first time figured.

Distribution. Sierra Leone: Njala (on Kola flowers); Zaire: Stanleyville (Yangambi) (Scherer 1962b); Kisangani, *Dimonika* (Bechyné 1968); Natal: Oribi Gorge Nat. Res. (Scherer 1963).
Distribution and bionomics in Kenya: Shimba Hills and Jadini Forest: >250♂♂, 1♀ at PA baits and at flowers of *Gynura scandens*; IX/83, IV/84, XII/84, VIII/85, IX/85, XII/85, VII/86, XII/86, IX/87, IV/88.

Gabonia bicolor, spec. nov.

Figs 7, 24, 39

Holotype: ♂, Kenya: Shimba Hills National Reserve, 04.-06.05.1984 (National Museum, Nairobi).- Paratypes: 240♂♂, 3♀♀, Kenya: Coast Province, 1983-1988.

Diagnosis. Length: 2.32-2.52 mm, av. 2.43 mm (n=16), holotype 2.40 mm; width: 1.32 mm; female: length 2.40 mm, width 1.36 mm.

Description
Head, pronotum and fore-legs bright reddish-brown; elytra and hind femora dark-brown with a reddish touch; hind tibiae infuscated; antennites 1-6 reddish-brown (1-4 more yellowish), 7 darker reddish, 8-11 dark-brown, nearly blackish, segment 11 at tip reddish.

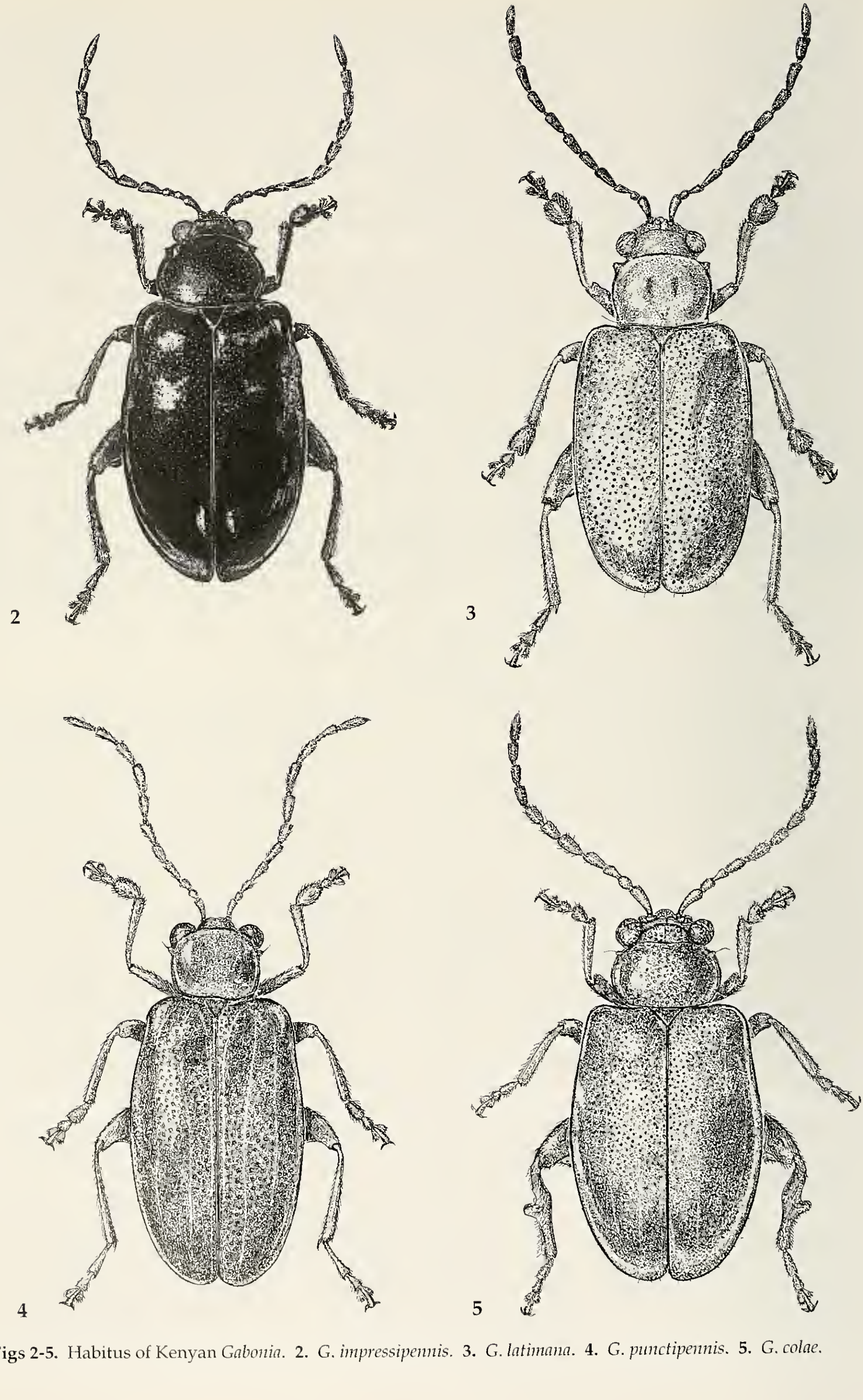
Antennal calli separated from each other by a fine line, bounded behind by a horizontal line which is marked with punctures; vertex with distinct punctures; frons 0.26 mm broad, eye diameter 0.24 mm. Antennae extending over first third of elytra; segments 5-11 nearly cylindrical, 4 more constricted towards base; lengths of antennites in mm: 0.22 : 0.08 : 0.10 : 0.14 : 0.14 : 0.14 : 0.14 : 0.14 : 0.14 : 0.13 : 0.22.

Punctures on pronotum as strong as those on vertex; sides slightly rounded and forming a semi circle with the base; hind angles only weekly marked; pronotum widest in the middle (0.8 mm), length 0.5 mm.

Elytra with distinct humeral calli but weakly developed basal calli; punctures distinctly stronger than those on pronotum, confusely arranged with a weak tendency to narrow longitudinal rows. Aedeagus (Fig. 24) 0.92-1.00 mm long, asymmetrical.

Hind tibiae with a hook-like structure (Fig. 7); first tarsal segment and fore-legs as broad as tibial apex.

Variation. There is much variation in the colour of the antennae, there are specimens with antennites 1-3 reddish and the rest blackish; punctation of head and pronotum can be fine; hind tibiae can be reddish or very dark.



Figs 2-5. Habitus of Kenyan *Gabonia*. **2.** *G. impressipennis*. **3.** *G. latimana*. **4.** *G. punctipennis*. **5.** *G. colae*.

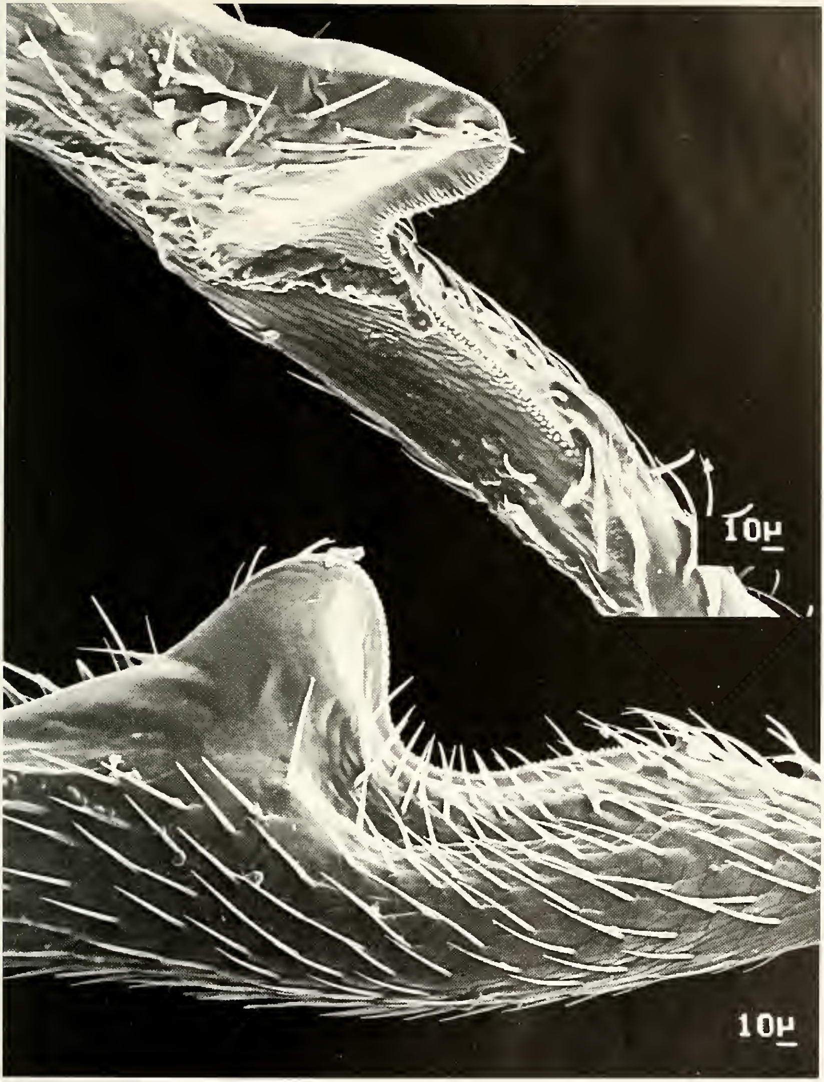


Fig. 6. Scanning electron micrographs of hind tibia of *Gabonia colae*.

Female. Frons 0.28 mm broad, eye diameter 0.24 mm; hind tibiae without hook-like structures, however, a very moderate curvature is noticeable. No differences to the male in size of body and pronotum. First tarsal segment of fore-tarsi narrower than apex of tibiae. Fig. 39 shows spermatheca.

Discussion. Apart from the colour, this species resembles strikingly *colae*, but the aedeagi are distinctly different in being asymmetric in *bicolor* and symmetric in *colae*.

Distribution and bionomics in Kenya. Shimba Hills and Jadini forest: > 240♂♂, 3♀♀, at PA-baits and at flowers of *Gynura scandens*; VIII/83, IV/84, V/84, XII/84, VIII/85, IX/85, VII/86, XII/86, IX/87, IV/88.

Gabonia tibialis, spec. nov.

Figs 8, 25, 40

Holotype: ♂, Kenya: Kakamega Forest, 01.12.1984 (National Museum, Nairobi). – Paratypes: 11♂♂, 1♀, Kenya: Kakamega Forest, 1984-1988.

Diagnosis. Length: 3.36-3.68 mm, av. 3.44 mm (n=4), holotype 3.40 mm; width: 1.52-1.68 mm, av. 1.60 mm (n=4), holotype 1.60 mm; female: length 3.56 mm, width 1.68 mm.

Description

Bright yellowish- to reddish-brown; pronotum and legs somewhat brighter, head darker; the last three antennites as bright as pronotum.

Frons narrow (0.20 mm) and eyes large (diameter 0.38 mm); antennal calli separated from each other by a fine line, bounded behind by a straight line; punctures on vertex somewhat finer than those on pronotum. Antennae extend backwards to middle of elytra; lengths of antennites in mm: 0.32 : 0.13 : 0.12 : 0.22 : 0.22 : 0.22 : 0.22 : 0.22 : 0.22 : 0.24 : 0.30.

Pronotum covered with punctures which are nearly as strong as those on elytra; pronotum comparatively small, sides straight and diverging somewhat anteriorly, width on hind angles 0.92 mm, near front angles 0.94 mm, and on front angles 0.88 mm, length 0.64 mm. Base of elytra broader than base of pronotum; humeral and basal calli distinct; punctation confuse, nearly no traces of narrow longitudinal rows.

Aedeagus (Fig. 25) 1.42 mm long, laterally arched, asymmetrical.

First tarsal segment of fore-tarsi as broad as tibial apex; hind tibiae with a hook-like structure.

Variation. In two specimens the punctation of head, pronotum and elytra is weak; antennae can be uniformely red-brown.

Female. Frons a little broader than in male (0.26 mm); eye as in male; punctation of elytra shows distinct traces of narrow longitudinal rows; no hook-like structure on hind tibiae rather a very weak curvature. Fig. 40 shows spermatheca.

Distribution and bionomics in Kenya. Kakamega Forest: 12♂♂, 1♀, at PA-baits only; XII/84, IX/85, XI/86, IV/87, VIII/87.

Gabonia crenicornis - group

This group comprises those species in which the males have a microscopically serrate structure on several antennal segments which appear comb-like if viewed from the sides; Bechyné (1955b, 1960a) has called it "Hyaline ridge". Species included in this group exhibit ridges on different segments: *carinulata* Bechyné, 1960: 6-11, *crenicornis* Bechyné, 1955: 6-9, *lukolela* Bechyné, 1960: 4-11, *pnirsa* Bechyné, 1960: 5-11.

Gabonia carinulata Bechyné

Fig. 11

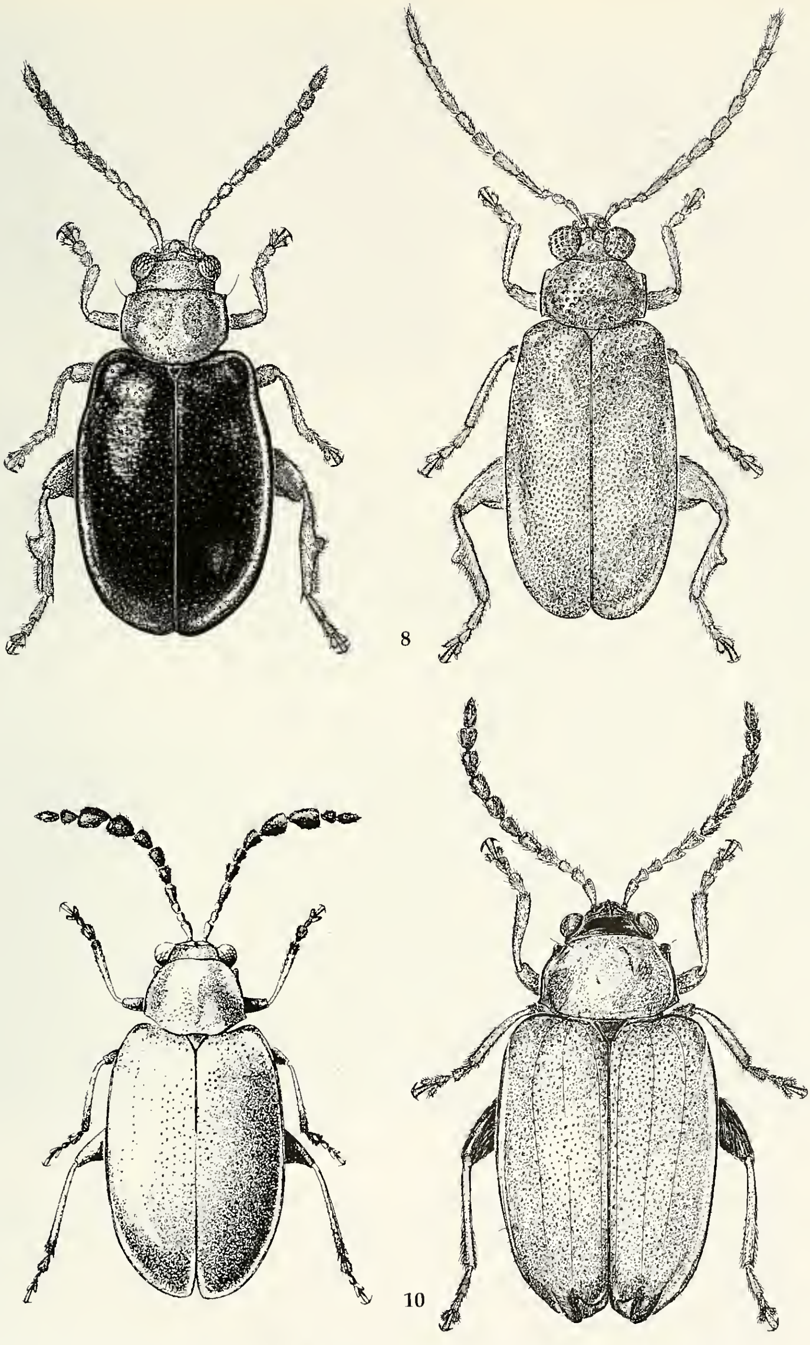
Gabonia carinulata Bechyné, 1960: 49.

Holotype: ♂, Zaire: Upemba Park (Riv. Dipid.) (Tervuren) (examined). The type specimen exhibits a serrate ridge on antennites 6-11, not on 5-11 as mentioned in the original description.

Fig. 11 scanning electron micrographs of antennae.

Distribution. Zaire: Upemba National Park (Bechyné 1960a).

Distribution and bionomics in Kenya. Kakamega Forest: >170♂♂, no ♀, at PA-baits only; IX/83, IV/84, XII/84, IX/85, XII/85, VI/86, XI/86, IV/87, V/87, IX/87, XII/87, III/88, V/88.



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Figs 7-10. Habitus of Kenyan *Gabonia*. **7.** *G. bicolor*. **8.** *G. tibialis*. **9.** *G. gabriela*. **10.** *G. nigroapicalis*.

Gabonia gabriela-group

This group comprises those species which have in the male sex various antennites enlarged and unusually shaped. A key to the species of this group (*inusitaticornis* Scherer, 1959, *comes* Bechyné, 1955, *diversicornis* Scherer, 1959, *maynei* (Laboissière, 1939), *media* (Weise, 1913), *nodicornis* (Laboissière, 1939), *gloria* Bechyné, 1955, *amplicornis* Bechyné, 1955) is given by Boppré & Scherer (1981).

Gabonia gabriela Scherer
Figs 9, 22c, 26, 41

Gabonia gabriela Scherer, in Boppré & Scherer 1981: 439.

Holotype: ♂, Kenya: Shimba Hills National Reserve (Zoologische Staatssammlung München) (examined). – Allotpye: ♀, Kenya: Shimba Hills National Reserve, July 1986, at *Vangueria tomentosa* Hochst. (National Museum, Nairobi).

Descripton of female. In contrast to males, female antennae are shorter and plainly filiform; the eyes are smaller and less convex (width of frons 0.42 mm, eye diameter 0.28 mm); the pronotum is shorter (width 1.12 mm, length 0.76 mm); fore-tarsi are somewhat narrower than apex of respective tibiae; the two females available are of equal size of the males. Fig. 41 shows spermatheca.

Distribution and bionomics in Kenya. Shimba Hills: >260♂♂, at PA-baits, at flowers of *Gynura scandens*, at flowers of *Ageratum conyzoides*, 2♀♀ at *Vangueria tomentosa*; XII/86, IX/87, IV/88 (cf. Discussion).

Gabonia gabrieletta, spec. nov.
Figs 22 A-B, 27

Holotype: ♂, Kenya: Jadini Forest, 05.12.1984 (National Museum, Nairobi). – Paratypes: 350♂♂, Kenya: Coast District, 1983-1985.

Diagnosis. Length: 2.84-3.36 mm, av. 3.10 mm (n=16), holotype 3.10 mm; width: 1.44-1.72 mm, av. 1.61 mm (n=19), holotype 1.56 mm. Female unknown.

Description
G. gabrieletta, spec. nov. can be readily separated from *G. gabriela* Scherer by morphometries including body length and ratio width of frons to eye diameter, as well as by body and antennae coloration. In all other phenotypic traits the two appear to be very similar.
The following contradiction indicates the differences:

G. gabrieletta, spec. nov.	*G. gabriela* Scherer
light reddish-brown	chestnut-brown
antennites 1-4 reddish	antennites 1-3 reddish
tarsi dark brownish	tarsi blackish
tibiae not darkened	basal $^2/_3$ of tibiae darkened
av. length 3.10 mm	av. length 3.71 mm
(n=16, range: 2.84-3.44 mm, av. 3.10 ± 0.2)	(n=15, range: 3.20-4.40 mm, av. 3.71 ± 0.3)

Variation. Variation in the antennae of *gabrieletta* permits some subdivision of the species. Beetles with a tenth antennite as long as wide, especially those from Jadini Forest, form one group. *G. gabrieletta* with antennite 10 longer than wide can be divided into two groups, one of which has antennites 4-7 nearly all of same length, and all somewhat longer than 2 and 3 combined. The other (third) group has antennite 4 somewhat longer than 2-3, but 5, 6 and 7 each distinctly shorter than 4 (Fig. 22 A-B).

256 measurements had been taken in addition to the antennal structure, but no significant differences have been found. Very small differences can be seen, with difficulty, in the aedeagus (Figs 26-27).

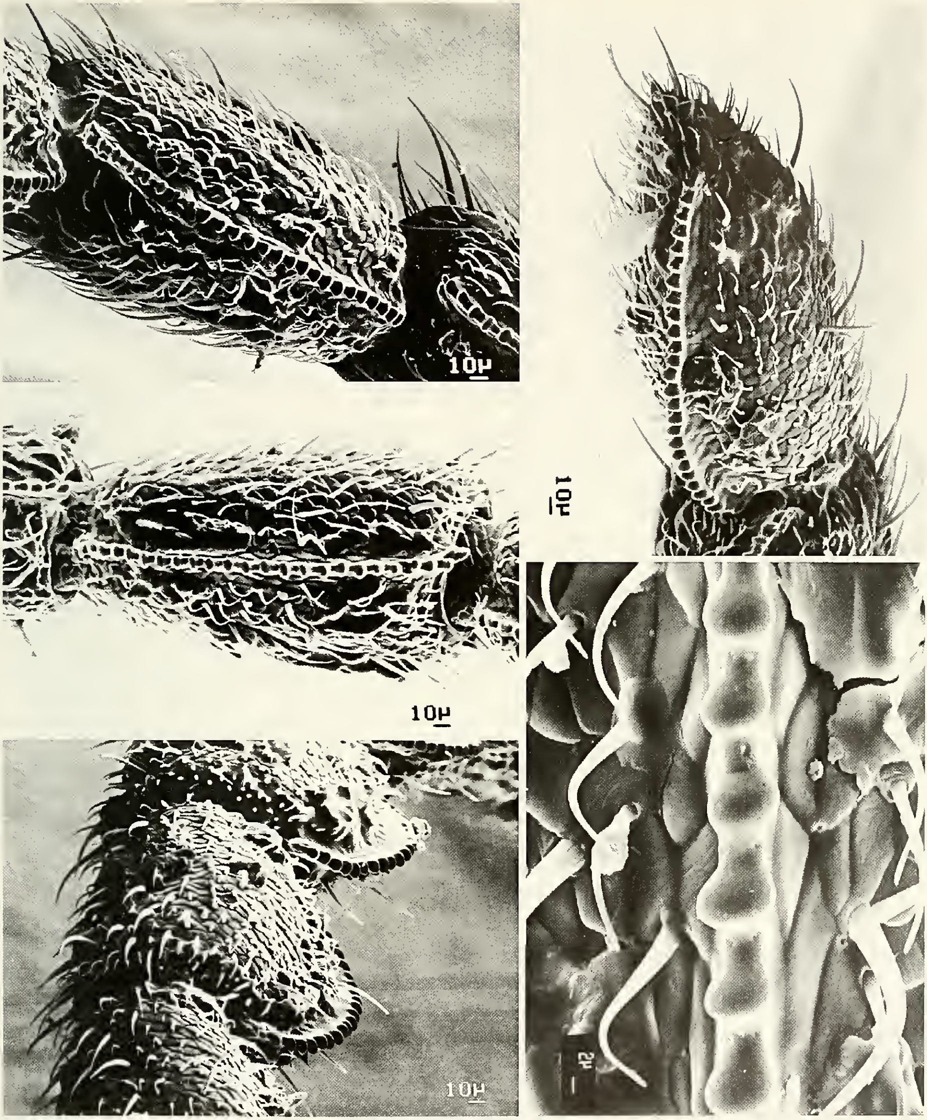


Fig. 11. Scanning electron micrographs of antennae of *Gabonia carinulata*.

Distribution and bionomics in Kenya. Shimba Hills and Jadini Forest: >389♂♂, no ♀, at PA-baits only; VIII/83, IX/83, XII/84, VIII/85, IX/85.

Gabonia pustulatipennis-group

This group comprises those species in which the elytra of the males have pits at the apices close to the sutures. These pits can be surrounded by swellings.

Key to species with elytral pits near suture

1. Smaller species, length 2.4-2.8 mm .... 2.
– Larger species, length 3.0-3.8 mm .... 5.

2. Elytral suture broadly black; elytral pit somewhat preapical, as far from elytral point as pit is long; pit arched, more or less parallel to suture, its outer side margined by a swelling; length 2.4-2.8 mm. Distribution: Guinea; Nigeria; Zaire: Haut-Uelé .... *G. variola* Bechyné, 1955
– Elytral suture not black; pit closer to apical point .... 3.

3. Elytral pit moderate and elongate, directed forward-outward .... 4.
– Elytral pit obviously deep and not elongated, tip of elytra nearly distorted and in most specimens darkened to black; clearly noticeable swellings around pits; head dark-brown, almost black, length 2.6-2.8 mm (extremes 2.3-2.9 mm) .... *G. nigroapicalis*, spec. nov.

4. Elytral pits without swellings; yellowish-brown, only labrum black; length 2.6 mm. Distribution: Guinea .... *G. ganganensis* Bechyné, 1955
– Elytral pits with moderate swellings; yellowish-brown; head (at least frons or labrum) chocolate-brown; length 2.6-2.8 mm. Distribution: Guinea; Ivory Coast; Zaire: Haute-Uelé; Sudan: Equatoria .... *G. nasalis* Bechyné, 1955

5. Length 3 mm .... 6.
– Longer species, length 3.76 mm; labrum and apical half of hind femora black; body reddish-brown; elytral pits close to utmost point of elytra and surrounded by very strong swelling .... *G. cavipennis*, spec. nov.

6. Head and pronotum chocolate-brown, apical half of hind femora black; elytra yellowish-brown; elytral pits close to apical point, very deep near suture and surrounded by swellings; punctation on elytra irregular. Distribution: Zaire: Lubumbashi (Elisabethville) .. *G. pustulatipennis* Scherer, 1962
– Only labrum and apical half of hind-femora black, rest of body yellowish-brown; elytral pits without swellings; punctation on elytra in more or less regular but very narrow rows .... *G. foraminipennis*, spec. nov.

Gabonia nigroapicalis, spec. nov.
Figs 10, 28

Holotype: ♂, Kenya: near Maragoli, III-V/1986 (National Museum, Nairobi). – Paratypes: 122♂♂, Kenya, same data as holotype.

Diagnosis. Length: 2.32-2.88 mm, av. 2.67 mm (n=21), holotype 2.74 mm; width: 1.20-1.44 mm, av. 1.31 mm (n=12), holotype 1.36 mm. Female unknown.

Description
Head, scutellum, apices of hind femora, depressions on apices of elytra, and antennites 4-11 (4-5 somewhat brownish) black; pronotum and elytra yellowish-brown; reddish-brown antennites 1-3 and legs; tarsi dark-brown.

Antennal calli diverging to hind edge of eyes, not bounded horizontally; vertex nearly smooth, extreme fine scratch-like punctures recognizable (>50 x); width of frons 0.34 mm, eye diameter 0.26 mm. Antennae extending backwards over basal calli of elytra; segments 4-11 (especially 7-11) thick, ratio length to width about 2:3; lengths of antennites in mm: 0.22 : 0.10 : 0.12 : 0.16 : 0.16 : 0.16 : 0.18 : 0.16 : 0.16 : 0.16 : 0.19.

Pronotum extremely fine punctured; sides weakly rounded, broadest at base, 0.93 mm; short behind front angles 0.78 mm broad; length 0.55 mm; base in the middle slightly indentated.
Punctures on elytra distinctly stronger than those on pronotum with a little tendency to longitudinal rows; humeral calli distinct, basal calli weakly developed; apices of elytra with a strong impression which is both elytra in common, in front and especially behind this impression on each elytron a strong swelling (Fig. 10).

Aedeagus (Fig. 28) 1.22 (1.20-1.24) mm.

First segment of fore-tarsi narrower than apex of tibia.

Variation. The large material of males includes a few in which the apical impression on elytra are less dark coloured; the length of the antennae is variable.

Distribution and bionomics in Kenya. Near Maragoli: 123♂♂, no ♀, at PA-baits only; III-V/86.

Gabonia foraminipennis, spec. nov.

Figs 12, 29, 42

Holotype: ♂, Kenya: near Maragoli, 21.11.1984 (National Museum, Nairobi). – Paratypes: 82♂♂, 1♀, Kenya: near Maragoli, XI/1984, III-V/1986.

Diagnosis. Length: 2.80-3.12 mm, av. 2.99 mm (n=21), holotype 3.0 mm; width: 1.5 mm; female: length 3.16 mm, width 1.36 mm.

Description

Yellowish/reddish-brown; labrum, palpi, antennites 5-11, apical half of hind femora, and tarsi black. Head smooth with some scattered fine punctures on vertex; antennal calli well defined; distance between eyes 0.36 mm, eye diameter 0.28 mm. Antennae extending back to mid-point of elytra; antennites 6-11 more cylindrical, 3-5 more slender near base; lengths of antennites in mm: 0.23 : 0.11 : 0.12 : 0.16 : 0.16 : 0.16 : 0.16 : 0.16 : 0.17 : 0.17 : 0.24.

Pronotum distinctly but not densely punctured; lateral margins of basal half nearly parallel; anteriorly more constricted to front angles. Width of pronotum near base 0.98 mm, just behind front angles 0.85 mm on front angles 0.87 mm; length 0.6 mm; not as broad as base of elytra.
Elytra with inconspicuous basal calli; humeral calli distinct; elytral sides more or less parallel; punctation comparatively strong, punctures arranged in more or less orderly narrow rows; just before apex near suture, there is a round and shallow depression in both elytra, there is no marked swelling proximal/distal or around this impression.

Aedeagus (Fig. 29) 1.38 mm long.

Fore-tarsi not markedly widened, even somewhat narrower than tibiae.

Variation. Within the 83 specimens studied, a few bear fine punctures on the head, some have a darker head, a few dark-brown elytra, and some a blackish-brown abdomen.
Females without any apical depression near apex of elytra. Pronotum somewhat longer than in the male (0.66 mm), but width about the same; the rounded lateral margins lack a hind angle in the base; in front of the base is a shallow despression on the pronotum. Frons 0.42 mm broad, eye diameter 0.23 mm, lengths of antennites in mm: 0.20 : 0.08 : 0.16 : 0.18 : 0.17 : 0.16 : 0.18 : 0.16 : 0.16 : 0.16 : 0.25. Fig. 42 shows spermatheca.

Distribution and bionomics in Kenya. Near Maragoli: 83♂♂, 1♀, at PA-baits only; XI/84, III-V/86.,

Gabonia cavipennis, spec. nov.

Figs 13, 30

Holotype: ♂, Kenya: Shimba Hills National Reserve, 20.08.1985 (National Museum, Nairobi). – Paratypes: 36♂♂, Kenya: Coast Province, 1985-1987.

Diagnosis. Length: 3.28-3.96 mm, av. 3.59 mm (n=11), holotype 3.88 mm; width: 1.72-2.08 mm, av. 1.95 mm (n=10), holotype 2.0 mm. Female unknown.

Description

Reddish-brown; labrum, palpi, antennites 6-11, apical third of hind femora and tarsi black; tibiae apically darkened; antennite 5 somewhat blackened.

Head smooth, no punctures on vertex; antennal calli well defined; distance between eyes 0.42 mm; eye diameter 0.30 mm. Antennae extending backwards to middle of elytra; antennites 6-11 more cylindric, 3-5 more slender near base; lengths of antennites in mm: 0.27 : 0.14 : 0.13 : 0.17 : 0.20 : 0.18 : 0.18 : 0.17 : 0.18 : 0.16 : 0.20.

Pronotum covered with extremely fine punctures, the distance between punctures about 3-4 × diameter of a puncture. Sides lightly rounded, length 0.82 mm, width 1.44 mm, comparatively broad, as broad as base of elytra, and broadest at base.

Elytra without basal calli and consequently lacking postbasal depression, general appearance oval, humeral calli distinct; punctation fine and largely unorganized into longitudinal rows which can be traced very rarely and only for very short distances. Apically, near the suture, is a deep, short depression in both elytra, basad each of which is a strong swelling.

Aedeagus (Fig. 30) 1.78 mm long.

Tarsal segments on fore-legs only slightly widened.

Variation. Some specimens have antennites 1-4 reddish and 5-11 black or 5 darkened.

Distribution and bionomics in Kenya. Shimba Hills National Reserve: 37♂♂, no ♀, at PA-baits and at flowers of *Gynura scandens*; VIII/85, VII/86, XII/86, VI/87.

Gabonia bifoveolata-group

This group comprises those species in which the elytra of the males widen distinctly at about 1/3 of the elytral length (as measured from the base), beyond which they are constricted apically. Shortly before the point of maximum width near the lateral margin and behind the humeral calli, is a longitudinal or roundish depression which, in some cases, is also modified with swellings.

Key to species with depressions close to lateral margins of elytra behind humeral calli

1. Uniformly brown, head can be black and elytra dark-brown .... 2.
– Not uniformly brown, elytra black or yellow with red-brown margins .... 3.

2. Uniformly red-brown, elytra rarely somewhat blackish-brown; antennites 5-11 black, all antennites cylindrical; tarsae slightly darkened; hind femora uniformly reddish; hind tibiae straight; length 3.2-3.7 mm .... *G. bicaveata*, spec. nov.
– Pronotum and elytra reddish-brown; head black, only labrum and palpi brown; antennites 6-11 black; antennites 4-7 triangulary widened; apices of hind femora black; hind tibiae curved; length 4 mm. Distribution: S. Zaire: Upemba Park .... *G. kaswabilenga* Bechyné, 1960

3. Yellowish-brown; vertex with two black spots; scutellum, side margins, base and apices of elytra red-brown; length 5 mm. Distribution: Guinea .... *G. malacorhinoides* Bechyné, 1955
– Elytra black; head and pronotum reddish-brown .... 4.

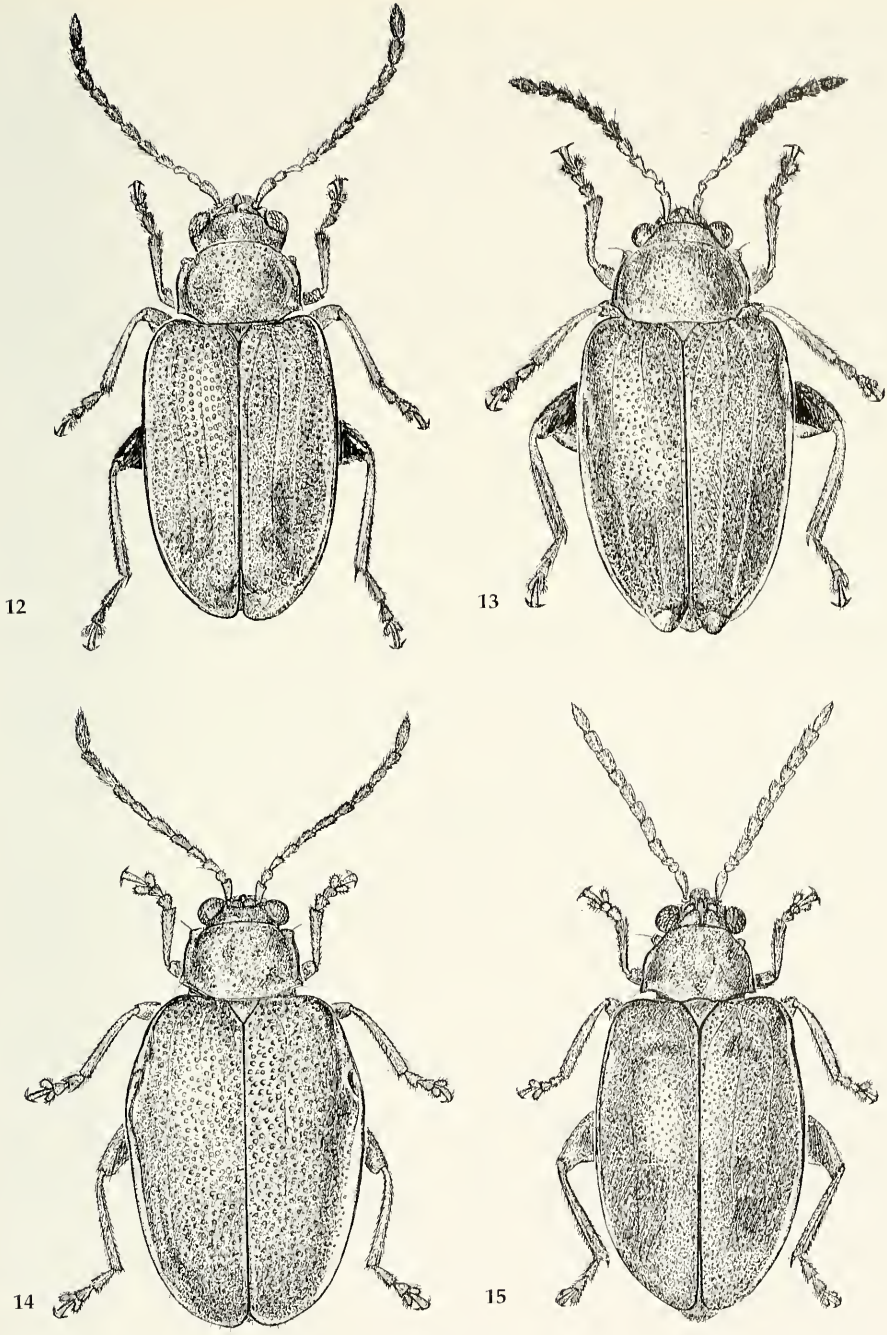
4. Length 5.5 mm. Distribution: E. Africa: Kwai .... *G. jacobyi* (Weise, 1902)
– Length 3 mm. Distribution: Ghana: Ashanti .... *G. bifoveolata* (Weise, 1895)

Gabonia bicaveata, spec. nov.

Figs 14, 31

Holotype: ♂, Kenya: near Maragoli, III-V/1986 (National Museum, Nairobi). – Paratypes: 2♂♂, Kenya, same data as holotype; 1♂, 4♀♀, Kenya: Mbita Point, V/1980.

Diagnosis. Length: 3.32-3.68 mm, av. 3.50 mm (n=3), holotype 3.6 mm; width 1.92-2.32 mm, av. 2.08 mm (n=3), holotype 2.32 mm; female, length 3.24-3.40 mm, av. 3.31 mm (n=4).



Figs 12-15. Habitus of Kenyan *Gabonia*. **12.** *G. foraminipennis.* **13.** *G. cavipennis.* **14.** *G. bicaveata.* **15.** *G. fulvicornis.*

Description
Head and elytra bright reddish-brown; pronotum and legs more yellowish-brown; tarsi darkened; antennites 1-4 reddish-brown, 5-6 dark reddish-brown, 7-11 dark-brown/blackish.

Width of frons 0.4 mm; eye diameter 0.31 mm, vertex nearly smooth, fine punctures recognizable (> 50 ×); antennal calli bounded behind by a deep line and separated from each other by a distinct line; frons roof like, frontal ridge distinct but not sharp. Antennae extending backwards along first fourth of elytra; lengths of antennites in mm: 0.30 : 0.12 : 0.16 : 0.20 : 0.20 : 0.22 : 0.22 : 0.22 : 0.20 : 0.20 : 0.28. Pronotum extremely fine punctured; sides nearly straight but slightly converging anteriorly; width near hind angles 1.19 mm, near centre 1.17 mm, just behind front angles 1.06 mm; length of pronotum 0.74 mm.

Elytra widen conspicuously from base backwards to ⅓ of elytral length, from this point towards apex they get constricted; width of elytra at the widest point towards apex they get constricted; width of elytra at the widest point 2.32 mm, where laterally a deep, roundish to oval hole is located; below this hole the epipleura are extremely broad and are abruptly and extremely narrowing apically; punctation on elytra distinct and confuse; on short distances more or less narrow regular rows can be seen.

Aedeagus (Fig. 31) 1.46 mm long.

First segment of fore-tarsi somewhat wider than apex of tibia.

Variation. Two specimens have a reddish head, pronotum and elytra which is mixed with piceous, the elytral suture is very narrowly stained with dark red-brown; tibiae and tarsi are darkened.
Female. Compared to the males elytra are less widening from base backwards, they are only 1.9 mm broad; instead of a hole at the widest point near margin they have a moderate convex, but round and smooth spot; epipleura are shaped as in the male; first segment of fore-tarsi are somewhat narrower than apex of tibiae.

Distribution and bionomics in Kenya. Near Maragoli: 3♂♂, no ♀, at PA-baits only; III-V/86. 1♂ and 4♀♀ were collected by D. Furth at Mbita Point (V/80) by sweeping (cf. Furth 1985).

Gabonia coffeae-group

This group comprises species which are about 4 mm in length, and have reddish-brown head, pronotum and elytra. The legs and antennae are in some cases darkened in part, and the antennae, fore-tarsi and elytra are structurally unmodified in the male.

G. fulvicornis, spec. nov. is very easily separable from the rest of this group by its straight pronotal sides which converge anteriorly. All other *coffeae*-group species have rounded pronotal sides; most *fulvicornis* have more yellowish-brown antennae and legs, which appear as good characters in addition to the straight pronotal sides. *G. fuscitarsis*, spec. nov. and *G. montivaga* Bryant, 1959 can be separated from the rest of the group by means of the antennae: all other *coffeae*-group species have comparatively short antennae, with antennites 4-11 cylindrical in shape, but *fuscitarsis* and *montivaga* have segments 4-11 longer, somewhat "cerambycid"-like in shape; in *montivaga* segments 7-10 are somewhat bowed, while in *fuscitarsis* segments 4-11 are narrow when seen from above (5:8), but segments 6-9 appear broadened and slightly compressed when viewed laterally. *G. montivaga* is separated from the new species by a weak depression on the pronotum which shows, under certain illumination, the four bosses typical of some *Gabonia* spp.

The rest of the species in this group, centered around *G. coffeae* (Laboissière, 1939) and *G. citri* (Laboissière, 1939), are very difficult to separate. They include *sawasawa* Bechyné, 1959, *kaniama* Bechyné, 1960, *ylla* Bechyné, 1960, *theobromae* (Bryant, 1944), and *aemula* Scherer, 1962, but *lutea* Scherer, 1959 is more distinct. *G. sheppardi* (Jacoby, 1906), of which the male is unknown, has black tarsi and blackish tibial apices. Conceivably, *sheppardi* represents the female of *testacea* (Weise, 1910).

Gabonia fulvicornis, **spec. nov.**
Figs 15, 32

Holotype: ♂, Kenya: Kakamega Forest, 27.06.1986 (National Museum, Nairobi). – Paratypes: 140♂♂, Kenya: Kakamega, 1984-1987.

Diagnosis. Length: 3.58-4.50 mm, av. 4.26 mm (n=16), holotype 4.2 mm; width: 1.83-2.33 mm, av. 2.14 mm (n=16), holotype 2.2 mm. Female unknown.

Description
Head, pronotum and elytra reddish-brown, shiny; front of labrum slightly darkened; legs and antennae yellowish-brown.

Frontal carina narrow and straight, not widening anteriorly; antennal calli well defined; frons (0.34 mm) somewhat narrower than eye diameter (0.36 mm); eyes very convex; at >50 x magnification scratch-like punctures are visible. Antennae extend backwards to more than ¼ way along the elytra; antennites 6-11 of cylindrical shape, 4 and 5 slightly, 3 strongly constricted at base; pubescence of antennites 4-11 fair; lengths of antennites in mm: 0.36 : 0.13 : 0.11 : 0.26 : 0.22 : 0.22 : 0.22 : 0.22 : 0.22 : 0.22 : 0.32.

Sides of pronotum nearly straight and converging in front, width of base 1.22 mm, just behind anterior angles 0.99 mm, length 0.8 mm, with extremely fine punctures (>50 x).

Base of elytra distinctly broader than base of pronotum; humeral calli distinct, basal calli very weak; behind humeral calli at lateral margin is a constriction beyond which the elytra widen again, and this indentation bears no groove; punctures on elytra very fine, not forming longitudinal rows.
Aedeagus (Fig. 32) 2.0 mm long.

Fore-tarsi only slightly enlarged, as broad as tibial apex.

Variation. The single punctures on the elytra can be marked by a dark halo, and the elytral suture can also be very narrowly darker reddish; very rarely antennites 8-11 blackish-brown and 4-7 darkened (4 out of 114 specimens), or in some specimens antennites 4-11 blackish-brown.

Distribution and bionomics in Kenya. Kakamega Forest: 145♂♂, no ♀, at PA-baits only; IX/83, VIII/85, IX/85, VI/86, IV/87, V/87, III/88.

Gabonia fuscitarsis, **spec. nov.**
Figs 16, 33

Holotype: ♂, Kenya: Shimba Hills National Reserve, 06.05.1984 (National Museum, Nairobi). – Paratypes: 13♂♂, Kenya: Shimba Hills National Reserve, IV/1988.

Diagnosis. Length: 4.00-4.72 mm, av. 4.34 mm (n=9), holotype 4.16 mm; width 1.88-2.20 mm (n=9), holotype 2.16 mm. Female unknown.

Description
Head, pronotum, elytra, antennites 1-3, and legs reddish-brown and shiny; front margin of labrum and tarsi blackish-brown; antennite 4 very dark reddish-brown; antennites 5-11 black.

Head smooth unless examined under a magnification of more than 50x, when puncture-like scratches become visible; antennal calli well-defined; frontal carina distinct but not sharp, flattened above; width of frons 0.50 mm; eye diameter: 0.36 mm. Antennae extending backwards to ½ way along elytra; when seen from above, segments 4-11 narrow, but widening laterally, 5-10 slightly compressed, ventrally very sharp, ratio width of upper side to side = 5:8; lengths of antennites in mm: 0.28 : 0.12 : 0.16 : 0.32 : 0.32 : 0.32 : 0.32 : 0.32 : 0.32 : 0.28 : 0.38.

Pronotum covered with punctures somewhat finer than those of elytra; sides rounded, margin groove-like; width at base 1.40 mm, just behind anterior angles 1.10 mm; length of pronotum 0.84 mm.
Elytral base not much broader than pronotal base; humeral calli distinct, basal calli very weakly developed; the punctation has some tendency to form narrowly separated longitudinal rows.

Aedeagus (Fig. 33) 1.56 mm long.

Tarsi of fore-legs only slightly enlarged, a little wider than apex of tibia.

Variation. There is variation in the body size (cf. Diagnosis), a slight variation in the intensity of the reddish-brown colour of head, pronotum, and elytra; some specimens have no blackish front margin of labrum, in one specimen the entire labrum is black; the length of the aedeagus varies from 1.56-1.76 mm with an average of 1.66 mm (n =6).

Distribution and bionomics in Kenya. Shimba Hills National Reserve: 14♂♂, no ♀, at PA-bait; V/84, IV/88.

Gabonia rubropicea - group

This group comprises three small dark species of 2.28-2.80 mm. They have no peculiar characters and males and females are alike. The males of *G. picea*, spec. nov. and *rubropicea*, spec. nov. can only be distinguished by the shape of the aedeagus. *G. compressicornis*, spec. nov. is characterized in the male by the antennae, which are, however, quite variable. There are no species known which relate to the three new ones described here.

Gabonia picea, spec. nov.
Figs 17, 35

Holotype: ♂, Kenya: Shimba Hills National reserve, XII/1985 (National Museum, Nairobi). – Paratypes: 85♂♂, 1♀, Kenya, same data as holotype.

Diagnosis. Length. 2.2-2.4 mm, av. 2.32 mm (n=13), holotype 2.24 mm; width: 1.12-1.40 mm, av. 1.24 mm (n=13), holotype 1.32 mm; female: length 2.28 mm, width 1.24 mm.

Description
Reddish-brown with a blackish-brown touch; head somewhat darker; margins of pronotum, scutellum, and elytra very narrowly dark-brown to black edged; femora brown like upper side, tibiae and tarsi somewhat stained with piceus; antennites 1-3 brown, 4-11 almost black.

Width of frons 0.26 mm, eye diameter 0.22 mm; frontal carina narrow and as antennal calli well defined; vertex with some very fine punctures. Antennae extend backwards up to the first third of elytra; segments 4-6 moderately constricted towards base, others cylindrical. Lengths of antennites in mm: 0.18 : 0.08 : 0.06 : 0.12 : 0.13 : 0.13 : 0.13 : 0.13 : 0.13 : 0.13 : 0.17.

Sides of pronotum slightly rounded, broadest near hind angles; width of pronotum 0.73 mm, length 0.48 mm; upper side of pronotum not very densely covered with punctures which appear finer than those of elytra.

Elytra with distinct humeral calli and well visible basal calli; punctures exhibit a very moderate tendency to longitudinal rows.

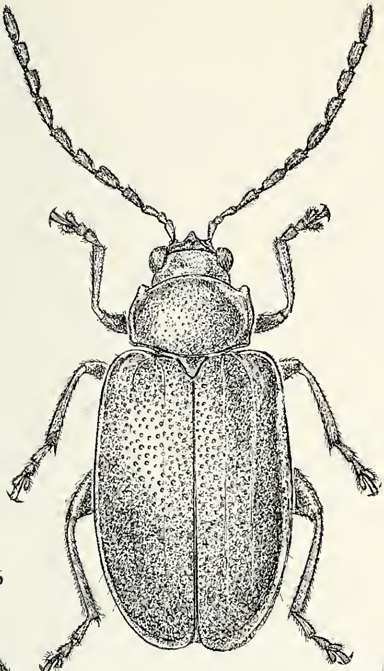
Aedeagus (Fig. 35) 0.92-1.00 mm long, apically pointed. (The aedeagus of the holotype was not dissected but its apex is ventrally to be seen.)

Variation. There is a variation to entirely dark piceus specimens with a colour of an unripe plum, and narrowly black elytral suture. Width of pronotum 0.74-0.77 mm, length 0.48-0.50 mm; width of frons 0.26-0.33 mm; eye diameter 0.20-0.22 mm.
Female. Width of frons 0.27 mm, eye diameter 0.20 mm, antennite 3 as long as 2.

Distribution and bionomics in Kenya. Shimba Hills: 90♂♂, 1♀, at PA-baits and at flowers of *Gynura scandens* (cf. Discussion); XII/85, XII/86.

Gabonia rubropicea, spec. nov.
Figs 18, 34, 44

Holotype: ♂, Kenya: Shimba Hills National Reserve, XI/1984 (National Museum, Nairobi). – Paratypes: 700♂♂, 20♀♀, Kenya, same data as holotype.



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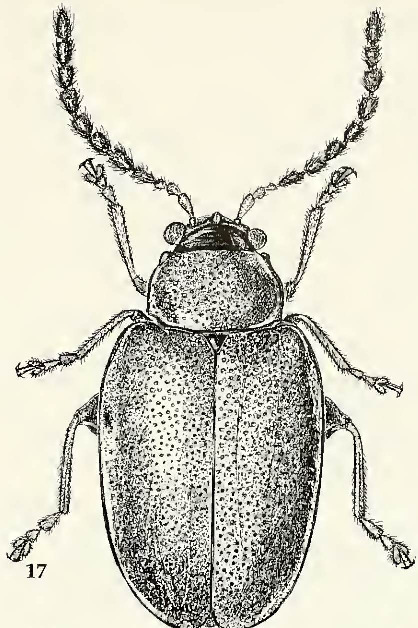

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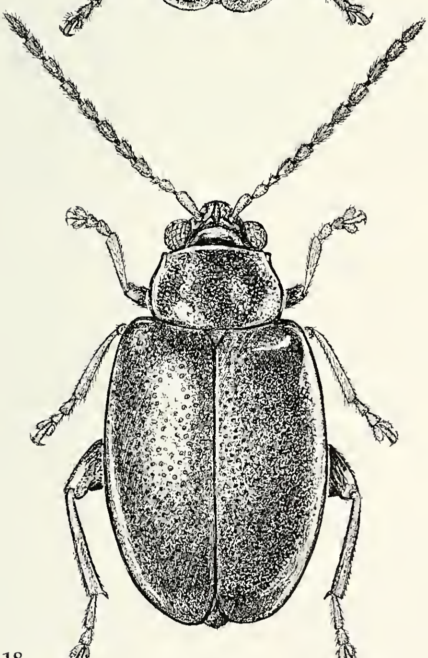

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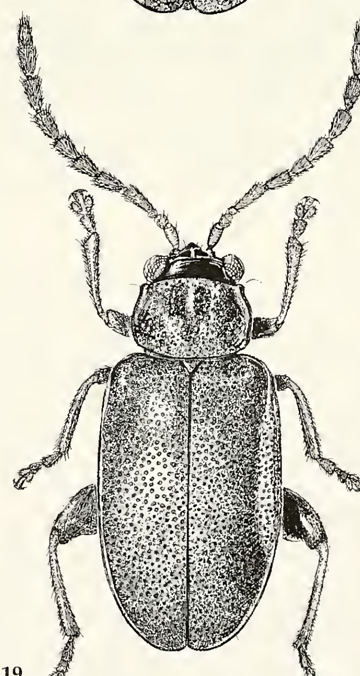

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Figs 16-19. Habitus of Kenyan *Gabonia*. **16.** *G. fuscitarsis*. **17.** *G. picea*. **18.** *G. rubropicea*. **19.** *G. compressicornis*.

Diagnosis. Length: 2.0-2.4 mm, av. 2.15 mm (n=18), holotype 2.28 mm; width: 1.00-1.24 mm, av. 1.07 mm (n=14); female: length 2.20-2.68 mm, av. 2.35 mm (n=8); width 1.20-1.32 mm, av. 1.23 mm (n=8).

Description

Head, pronotum, elytra, hind femora dark blackish-brown with a reddish touch like an unripe plum; elytral suture very narrowly black; antennites 1-3 reddish-brown, 4-6 darker reddish-brown, 7-11 pitch brown; fore-legs, hind tibiae, and tarsi red-brown.

Width of frons 0.29 mm; eye diameter 0.23 mm; frontal carina and antennal calli as in preceeding species, also punctures on vertex. Antennae extend backwards over basal calli of elytra; lengths of antennites in mm: 0.18 : 0.10 : 0.08 : 0.15 : 0.15 : 0.15 : 0.14 : 0.14 : 0.14 : 0.14 : 0.18.

Width of pronotum 0.76 mm, length 0,5 mm; sides slightly rounded; punctation on pronotum and elytra as in preceding species.

Aedeagus (Fig. 34) 1.0-1.06 mm long, apically spoon-like rounded.

Variation. Compared to *G. picea* there is hardly any variation in the colour of head, pronotum, and elytra, only a few specimens have a brighter pronotum and elytra. Much variation, however, occurs in the colour of the antennae, antennites 7-11 can be reddish, segments 4-11 can be dark-brown, in many specimens segment 11 is somewhat reddish. Some specimens have brown hind femora. Width of frons 0.26-0.30 mm, eye diameter 0.22-0.30 mm, width of pronotum 0.79-0.84 mm, length of pronotum 0.44-0.50 mm.
Female. Width of frons 0.30 mm; eye diameter 0.22 mm; fore-tarsi a little less wide; there are no other sexual differences. Fig. 44 shows spermatheca.

Discussion. A more or less constant character is the antennal colour. In *picea* the antennites 1-3 are always yellowish-brown and 4-11 dark-brown, almost black. In *rubropicea* segment 4 is mostly reddish, 5-11 dark-brown or even dark reddish, often 1-6 reddish, but there are exceptional examples with dark-brown segments 4-11. In *rubropicea* the colour of head, pronotum, and elytra seems to be more constant, it is always reddish piceus to dark-reddish piceus, in *picea* there are also reddish specimens and dark-brown ones with a reddish touch. The only distinct difference which makes them easily identifyable is the aedeagus: in *rubropicea* it is apically spoon-like rounded, in *picea* pointed (cf. figs 34 and 35).

Distribution and bionomics in Kenya. Shimba Hills and Jadini Forest: >700♂♂, 20♀♀, at PA-baits, at flowers of *Gynura scandens* and *Ageratum conyzoides*, and at living leaves of *Crotalaria* sp. (cf. Discussion); V/82, VI/82, IV/83, IX/83, IV/84, V/84, XI/84, XII/84, V/85, VIII/85, IX/85, XII/85, VI/87, IX/87, IV/88.

Gabonia compressicornis, spec. nov.

Figs 19, 36, 43

Holotype: ♂, Kenya: Shimba Hills National Reserve, 11.09.1985 (National Museum, Nairobi). – Paratypes: 59♂♂, 100♀♀, Kenya, same data as holotype.

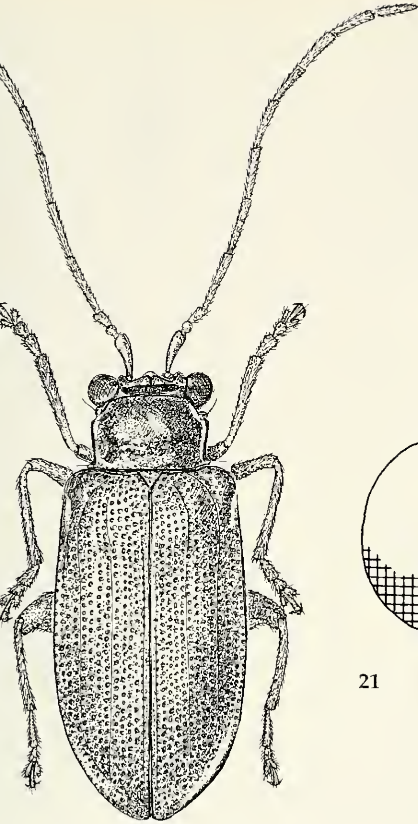
Diagnosis. Length: 2.48-2.88 mm, av. 2.71 mm (n=11), holotype 2.6 mm; width: 1.20-1.44 mm, av. 1.31 mm (n=11); female: length 2.48-3.04 mm, av. 2.71 mm (n=12), width 1.24-1.48 mm, av. 1.41 mm (n=12).

Description

Entirely dark-brown species with a reddish touch; antennites 1-3 reddish-brown, rest black; legs dark-brown.

Width of frons 0.37 mm; eye diameter 0.24 mm; antennal calli well defined, separated from each other by a fine line; vertex with a few very fine punctures. Antennae extend backwards over middle of elytra; antennites 7-11 laterally widened, especially 8-11 which are compressed in addition; lengths of antennites in mm: 0.23 : 0.08 : 0.05 : 0.24 : 0.20 : 0.18 : 0.20 : 0.20 : 0.22 : 0.21 : 0.30.

Width of pronotum 0.84 mm, length 0.6 mm; sides rounded and forming a semicircle with the base; hind angles small and hardly noticeable; upper surface covered with fine punctures, finer than those of elytra.



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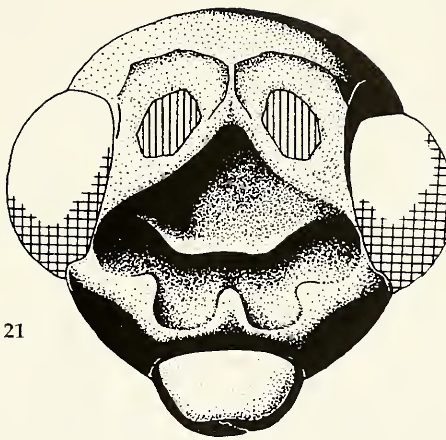

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Figs 20-21. *Nzerekorena filiconis.* **20.** Habitus. **21.** Head.

Elytra with well-defined humeral and basal calli, irregularly but heavily punctured.

Aedeagus (Fig. 36) 1.32 mm (1.26-1.37 mm) long, on its ventral side laterally with ridges.

Variation. Some specimens with punctation on pronotum nearly as strong as on elytra. Males collected on 18.8.1985 have antennae with segments 8-11 less compressed laterally.

Female. Frons 0.34 mm broad, eye diameter 0.24 mm; antennites 8-11 cylindrical, 4-7 somewhat constricted towards base. Fig. 43 shows spermatheca.

Distribution and bionomics in Kenya. Shimba Hills: 60♂♂, 100♀♀, at leaves of *Vangueria tomentosa* only; IX/83, V/84, XI/84, VIII/85, VII/86, IX/87.

Nzerekorena filicornis, spec. nov.

Figs 20, 21, 37, 45

Holotype: ♂, Kenya: Kakamega forest, 22.06.1986 (National Museum, Nairobi). – Paratypes: 13♂♂, 11♀♀, Kenya: Kakamega Forest, 1986-1987.

Diagnosis. Length 3.40-3.76 mm, av. 3.63 mm (n=6), holotype 3.60 mm; width 1.52-1.68 mm, av. 1.61 mm (n=6), holotype 1.64 mm; female: length 3.32-3.84 mm, av. 3.65 mm (n=10), allotype 3.52 mm; width 1.52-2.00 mm, av. 1.71 mm (n=10), allotype 1.68 mm.

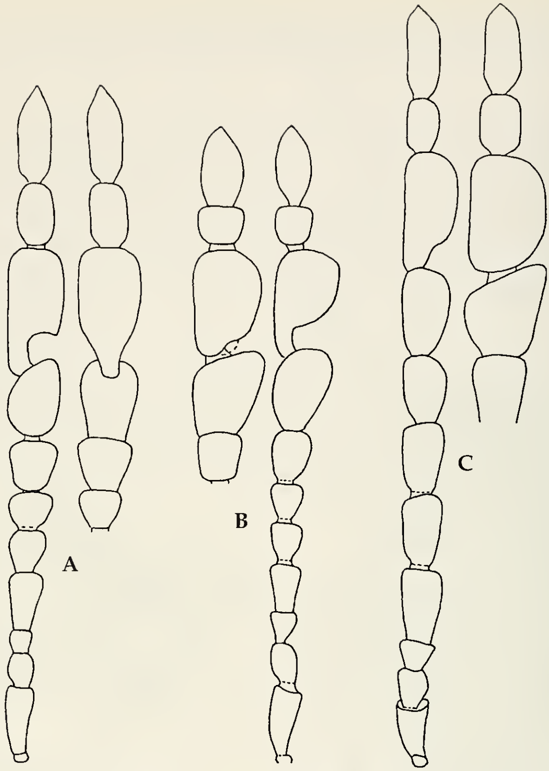


Fig. 22. Antennae. **A-B.** *Gabonia gabrieletta*. **A.** Shimba Hills, with longitudinal 10th antennal segment. **B.** Jadini Forest, with 10th antennal segment as short or shorter as wide. **C.** Antennae of *G. gabriela*, which are longer than in *G. gabrieletta*.

Description

Reddish-brown, legs more yellowish-brown; antennae reddish-brown, segments 6-9 darkened.

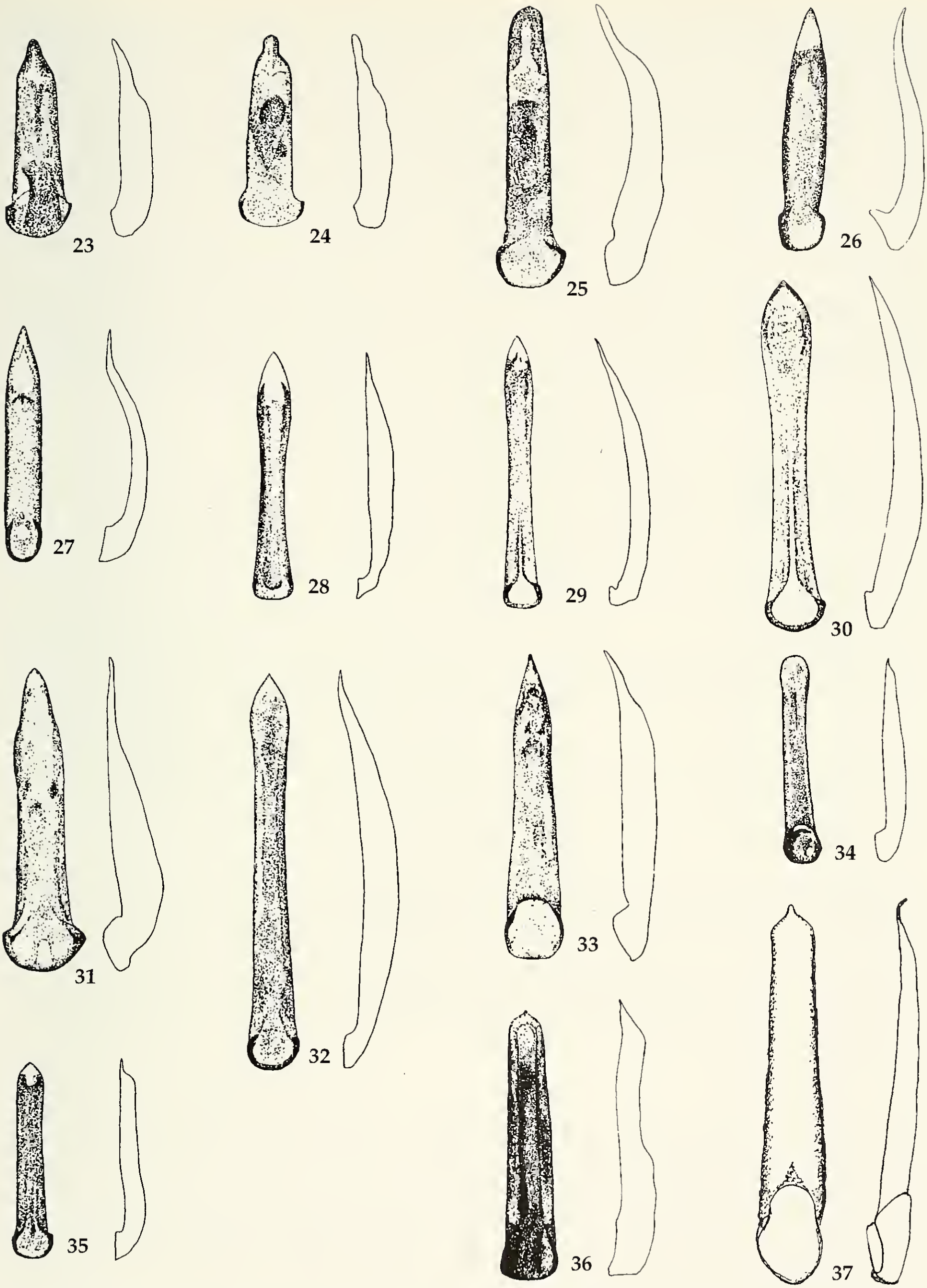
Head (Fig. 21) above antennal calli very short, with extremely fine scratch-like punctures; eyes obviously directed outwards; antennal calli chagreened and surrounding nearly like a semicircle the hind margin of antennal base, bounded behind by a deep line; frons 0.50 mm wide, eye diamter 0.36 mm; frons most extraordinary, deeply excavated from one eye to the other in front of antennal bases, this is not only a concave frons as in females or in other *Nzerekorena* species but a deep excavation to which the margins are projected and has in its centre a fine horizontal ridge. Antennae filiform and thin, extending to elytral decline; lengths of antennites in mm: 0.40 : 0.13 : 0.14 : 0.56 : 0.46 : 0.44 : 0.42 : 0.35 : 0.32 : 0.32 : 0.36.

Pronotum covered with fine, scattered but shallowly impressed punctures; punctures in the prebasal depression stronger and as strong as those on elytra; seen from above, it seems that the side margins are somewhat diverging in front; the reality shows that the pronotum is widest at base, the angles – or setiferous punctures – are directed outwards; width on hind angles of pronotum 0.98 mm, just in front of the hind angles 0.91 mm, and in the centre 0.94 mm; sides straight and nearly parallel; length of pronotum 0.62 mm.

Base of elytra distinctly broader than base of pronotum; basal calli distinct; punctation in narrow longitudinal rows.

Tarsi of fore-legs slightly broader than concerning tibiae.

Aedeagus (Fig. 37) 1.64 mm long.



Figs 23-37. Aedeagus. **23.** *Gabonia colae.* **24.** *G. bicolor.* **25.** *G. tibialis.* **26.** *G. gabriela.* **27.** *G. gabrieletta.* **28.** *G. nigroapicalis.* **29.** *G. foraminipennis.* **30.** *G. cavipennis.* **31.** *G. bicaveata.* **32.** *Gabonia fulvicornis.* **33.** *G. fuscitarsis.* **34.** *G. rubropicea.* **35.** *G. picea.* **36.** *G. compressicornis.* **37.** *Nzerekorena filoicornis.*

Variation. One specimen with antennites 6-11 and one with 4-9 darkened; in some specimens the elytral punctures are marked with a dark-red brown halo. Aedeagus varies from 1.64-1,68 mm in length.
Female. Frons 0.44 mm, eye diameter 0.33 mm; excavation on frons not as deep as in male but nevertheless distinct, a concave impression as known from other species of this genus; frontal longitudinal carina very thin; antennae shorter than in male: lengths of antennites in mm: 0.37 : 0.13 : 0.13 : 0.30 : 0.30 : 0.30 : 0.30 : 0.26 : 0.26 : 0.25 : 0.36; fore-tarsi only as broad as tibiae; there are no other differences to the male, even the pronotum shows the same measures. Fig. 45 shows spermatheca with transverse flutes which are absent in all examined spp. of *Gabonia*.

Distribution and bionomics in Kenya. Kakamega Forest: 14♂♂, 11♀♀, at PA-baits only; IX/85, VI/86, VIII/86, V/87, VIII/87, XII/87.

Discussion. The male is separated by its deeply, pit-like excavated frons from all other known *Nzerekorena* species. The female, which resembles somewhat *N. garambaensis*, is distinctly separated from this species by its basal calli on the elytra which are not heart-shaped and its shorter body length.

Key to recognized *Nzerekorena* species

1. Antennae long, but not longer than body .... 2.
– Antenna longer than body .... *N. cerambycina* Bechyné, 1955

2. No longitudinal frontal carina (only rudiments to be seen between antennae and on front margin of frons) .... 3.
– Frontal carina distinct .... 4.

3. Length 5 mm .... *N. carinulata* Bechyné, 1955
– Length 4 mm, pronotum with punctures only near base, impression on pronotum separated in the middle by a keel-like elevation, instead of a longitudinal carina on frons a longitudinal impression .... *N. clypeata* Bechyné, 1955

– Length 3.45-3.76 mm, pronotum with fine scattered punctures and stronger punctures in the half-moon-like impression, frons deeply pit-like excavated .... ♂ *N. filicornis*, spec. nov.

4. Pronotal impression like half-moon .... 5.
– Pronotal impression laterally restricted, not joining centrally .... 6.

5. Length 5 mm; frontal carina bulge-like, pronotum nearly smooth, only some scattered punctures inside impression, basal calli on elytra without prolongation along suture .... *N. macrophthalma* Bechyné, 1955
– Length 4.0-4.5 mm; longitudinal carina on frons between antenna bulge-like, from here very fine to front margin; punctation on pronotum fine and scattered, stronger and denser inside impression, basal calli on elytra very distinct and prolonged near suture backward, which gives them a heart-like appearance .... *N. garambaensis* Scherer, 1962

– Length 3.45-3.76 mm .... ♀ *N. filicornis*, spec. nov.

6. Length 5 mm, frons and vertex smooth and shiny .... *N. foveolata* Bechyné, 1955
– Length 4.5-4.8 mm, frons and vertex chagreened .... *N. basilewskyi* Scherer, 1962

Key to *Gabonia* and *Nzerekorena* species encountered at sources of PAs in Kenya

1. Antennites 6-11 with a microscopically serrate ridge .... *G. carinulata* Bechyné
– Withouth such a ridge on antennae .... 2.

2. Antennites 8-9 enlarged (Fig. 19) .... 3.
– Antennites normally shaped .... 4.

3. Light reddish-brown; antennites 1-4 reddish; tarsi darker brownish, tibiae not darkened; length 2.88-3.30 mm, av. 3.09 mm .... *E. gabrieletta*, spec. nov.
– Chestnut-brown; antennites 1-3 reddish; tarsi blackish, basal two thirds of tibiae darkened; length 3.2-4.4 mm, av. 3.70 mm .... *G. gabriela* Scherer

4. In fore-legs, 1st tarsal segment 1.3-1.5 x broader than apex of tibia (Figs 2-4); 2nd segment tiny (0.5 x 1st segment) .... 5.
– In fore-legs, 1st tarsal segment about as broad as apex of tibia; 2nd segment almost of same width as 1st .... 7.

5. Yellowish-brown, elytra can be darkened, tarsi darkened .... 6.
– Entirely black; a distinct depression across elytra; length about 5 mm .... *G. impressipennis* Laboissiere

6. Length 4.4-4.8 mm; head dull .... *G. latimana* Laboissière
– Length 3.8-4.4 mm; head shiny .... *G. punctipennis* Laboissière

7. Hind tibiae with hook-like structure (Figs 5-8) .... 8.
– Hind tibiae normal .... 10.

8. Eyes enlarged; width of frons narrower than eye diameter; pronotum narrow; base of elytra broader than base of pronotum; length 3.2-3.8 mm .... *G. tibialis*, spec. nov.
– Eyes of normal size; width of frons wider than eye diameter .... 9.

9. Entirely yellowish- to reddish-brown, only antennae apically darkened .... *G. colae* (Bryant)
– Reddish-brown, elytra black .... *G. bicolor*, spec. nov.

10. Elytra with pit-like depressions near side margins behind humeral calli or apically near suture .... 11.
– Elytra without pit-like depression .... 14.

11. Elytral depression near side margins of humeral calli .... *G. bicaveata*, spec. nov.
– Elytral depression apically near suture .... 12.

12. Elytral depression not darkened; only labrum black .... 13.
– Elytral depression darkened to black; head black; 2.6-2.8 mm .... *G. nigroapicalis*, spec. nov.

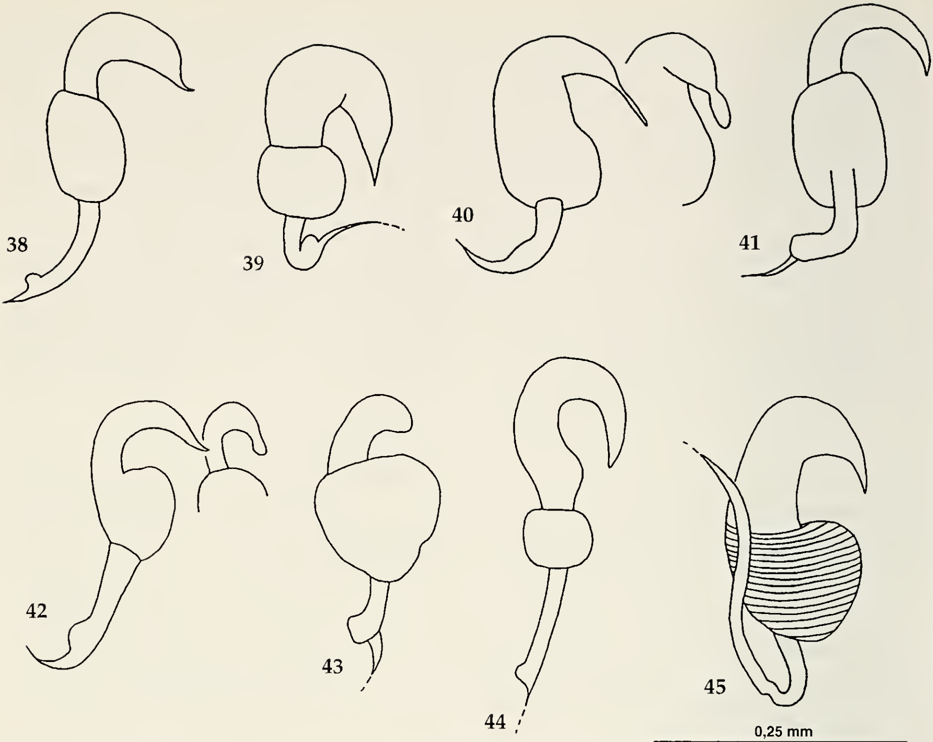
13. Length 3.8 mm; reddish-brown; antennal segments 1-5 reddish, rest black; general shape oval, elytra oval; punctation of pronotum and elytra fine; apical depression on elytra very strong with swelling behind .... *G. cavipennis*, spec. nov.
– Length 3 mm; yellowish-brown; antennal segments 1-4 yellowish-brown, rest black; general shape longitudinal, elytra more or less parallelly sided; punctation on pronotum and elytra fine but distinct; apical depression on elytra less strong, without a swelling .... *G. foraminipennis*, spec. nov.

14. Reddish-brown, length 3.45-4.60 mm .... 15.
– Blackish-brown, length 2.28-2.80 mm .... 17.

15. Antennae filiform, very thin and long, up to apical decline of elytra; antennite 4 as long as 1+2+3; transverse depression behind middle of pronotum .... *Nzerekorena filicornis*, spec. nov.
– Antennae stronger, shorter, antennite 4 as long as 2+3; no transverse depression of pronotum16.

16. Antennae and legs yellowish-brown; length 3.58-4.50 mm .... *G. fulvicornis*, spec. nov.
– Antennites 4-11 black; tarsi darkened; length 4.2 mm .... *G. fuscitarsis*, spec. nov.

17. Aedeagus apically pointed (Fig. 35) .... *G. picea*, spec. nov.
– Aedeagus apically rounded (Fig. 34) .... *G. rubropicea*, spec. nov.



Figs 38-45. Spermatheca. **38.** *Gabonia colae.* **39.** *G. bicolor.* **40.** *G. tibialis* (different views). **41.** *G. gabriela.* **42.** *G. foraminipennis* (different views). **43.** *G. compressicornis.* **44.** *G. rubropicea.* **45.** *Nzerekorena filicornis.*

Discussion

The status of the classification of the genus *Gabonia* and its closely related genera is badly in need of a thorough revision. Practically nothing has been recorded on biology and ecology of these beetles. In the literature, information is scant even concerning the plants on which *Gabonia* have been collected. Le Pelley (1959) reports *Gabonia* sp. at *Hibiscus* sp. and *G. fracta* Bechyné, 1960 at *Coffea robusta*, but it is uncertain if these are host plants or not. Weise (1913, 1915) noted *G. antennalis* (Weise, 1913) and *G. pedestris* (Weise, 1915) (both as *Jamesonia*) having been baited with dead birds, which is currently inexplicable.

Finding males of 17 species of *Gabonia* to be strongly attracted to sources of pyrrolizidine alkaloids, unfortunately, did not yet result in conclusive biological knowledge on the genus – rather numerous new questions are being raised. Our difficulties in finding the majority of *Gabonia* species other than at PA-baits suggest, in combination with the recognition of their frequent nocturnal activity, that these beetles have an unusual life-style. Perhaps they mainly live in the canopy or some other habitat equally inaccessible to us, and/or they may be nocturnal in all their other adult activities. However, the large number of specimens obtained from PA-baits proves *Gabonia* to be by no means rare, and the fact that relatively few specimens are deposited in museum collections supports the above suggestion. Since our opportunistic collecting during a few visits to only some Kenyan habitats has resulted in the recognition of 12 new species, it must be suspected that many if not the majority of *Gabonia* species, are yet to be discovered. These arguments also seem to be valid for *Nzerekorena*.

The field data provided above are incomplete with respect to geographical distribution and habitat requirements. Looking for evidence for seasonality based on the dates of collection, specifying bait attractivity based on numbers of beetles gathered from a given bait etc. is not permissable because baiting was not conducted regularly. In particular, there are insufficient data to provide quantitative assessments of the relative attraction of the different types and/or amounts of PAs used as bait. Undoubtedly, the baits were not equally attractive, but under the given field conditions there were many unaccessable environment factors including strength and direction of wind, position of bait etc. Regardless of these limitations of the present work, attraction of *Gabonia* and *Nzerekorena* to sources of PAs is an interesting phenomenon. Without doubt, the beetles seek PAs and no other chemical(s) present in PA-plant because not only withered plants but also purified PAs are attractive. According to most recent findings on arctiid moths attracted to PAs, it is a volatile decomposition product of PAs which serves as an air-borne stimulus for PA-seeking behaviour (Bogner & Boppré 1989), and pilot tests in Kenya indicate that the beetles use the very same stimulus as Lepidoptera do.

Finding *Gabonia* at flowers of *Gynura scandens* was not surprising after it had been recognized that they are highly attractive for PA-utilizing Lepidoptera but not attractive for other nectar-searching insects (Boppré unpubl.). Subsequent chemical analyses (Wiedenfeld 1982) revealed *Gynura* as a plant rich in PAs, and it seems – where and when available – a major natural source of pyrrolizidine alkaloids. The same is true for *Ageratum conyzoides* (cf. Boppré & Wiedenfeld in prep., Wiedenfeld in prep.) which is a common if not the most common PA-plant.

There are obvious parallels between *Gabonia* and pharmacophagous insects known to be dependent on PAs. Such species take up PAs independent of feeding behaviour and utilize these allelochemics for a specific purpose other than primary metabolism or foodplant recognition (for definition of pharmacophagy see Boppré 1984). In Lepidoptera, for example, species of various families gather PAs as adults and store the plant chemicals for defence, the males of a variety of species synthesize a sex pheromone from PAs, and sex- and organ-specific growth regulation by PAs has also been recognized (for review see Boppré 1986, 1990). Attraction of *Zonocerus* (Orthoptera: Pyrgomorphidae; Boppré et al. 1984) and of certain Chloropidae (Diptera) (Boppré & Pitkin 1988) also occurs. However, with respect to *Gabonia*, the beetles cannot yet be called pharmacophagous because we still lack proof that they sequester the plant metabolites for a specific purpose.

Of some Lepidoptera (e.g. *Creatonotos*) the larvae are pharmacophagous with respect to PAs. If this is paralleled by *Gabonia* or other chrysomelid larvae remains an open question. The genus *Longitarsus* seems to be restricted to *Heliotropium* and/or other PA-containing plants (e.g. Frick 1970, Furth 1979, Huber 1981, Wapshere 1980); however, it is neither known if these chemicals play a role in host-finding, nor if they are sequestered.

While *Gabonia* and *Nzerekorena* are the only Coleoptera so far recognized to be attracted to PAs, attraction to and uptake of secondary metabolites is found in other beetles, too. Phenomenologically, the relation of the chrysomelids to PAs strongly resembles the one of Anthicidae (and other insects) to cantharidin: cantharidin, a secretion of meloid beetles, attracts – even in pure form – species of e.g. *Notoxus* and *Anthicus* and others which appear to take up the chemical; often, visitation of sources of cantharidin is sex-biased (for refs. see e.g. Görnitz 1937, Young 1984).

The question of the biological significance of visits by male *Gabonia* and both sexes of *Nzerekorena* to sources of pyrrolizidine alkaloids, briefly considered for *G. gabriela* by Boppré & Scherer (1981), is now seen more clearly. Although the sex-bias in *Gabonia* is indicative of a sexual function, it will be impossible to investigate functional aspects of the PA relationship unless the species can be reared. However, we can exclude the idea that PAs mimic a female sex pheromone because sympatric species are lured to PA-sources at the same time of day. Furthermore, the beetles ingest the chemicals, which is not to be expected if a female pheromone mimic was involved.

Morphological peculiarities in males occur in the majority of known *Gabonia*. There is no restriction of these sexual characters to a certain part of the body, rather elytra, antennae, tarsae, tibiae of hind legs are affected in various ways. Apart from the structures mentioned in this paper, there are species showing skijump elevations on the hind part of the elytra (e.g. in *G. unicostata* Jacoby, 1893), males of a group around *G. custos* (Weise, 1895) exhibits triangularly enlarged antennal segments, in *G. crassipes* Scherer, 1959 the hind tibiae are swollen in their centres, *G. miraculosa* Scherer, 1963 shows in the male hind femora with a deep excavation in which a chitinized peg is to be seen; this species and *descarpentriesi* Bechyné, 1968, a species likewise with excavated hind femora in the male, was placed by Bechyné (1968) in an own genus *Dimonikaea*.

Although, to date, we lack any evidence on the significance of the male peculiarities, they might turn out as a key for understanding uptake of PAs. Structurally, they greatly resemble the "Excitatoren" (= excitatory organs) found in Malachiidae (e.g. Evers 1958, 1963, Matthes 1960, 1962, 1972): male malachiids exhibit structural peculiarities of antennae, tibiae, thorax, head etc. which all seem to be glandular and equipped with sensory hairs. For several species, processing different types of Excitatoren, the mating behaviour has been studied, and it turned out, that prior to mating females nibble at the Excitatoren, apparently gathering secretion (and perhaps stimulating the male mechanically, too). For *Gabonia gabriela* it has been proved that antennites 8 and 9 are glandular (Fischer & Boppré 1990). Probably, the male peculiarities in other species are glandular, too: under SE♂, even visible under a stereo microscrope, the respective areas are usually covered by a crusty material, perhaps a coagulated secretion. Further histological but also chemical studies which we plan in addition to behavioural and further ecological work, might reveal that the male characters are the key for explaining the visitation of PA-sources: perhaps, as in several Lepidoptera (cf. Boppré 1986, 1990), PAs are used as precursors of male pheromones and/or as defensive chemicals presented to the females as nuptual gifts.

With respect to taxonomy, we have used male secondary features of *Gabonia* as taxonomic characters – an approach which is not unquestionable. For example, tibial hooks are typical for the *colae*-group, which is, however, diverse with respect to the aedeagi (symmetrical in *bicolor*, but asymmetrical in *colae* and *tibialis*); also, the ductus of the spermatheca in *colae* is quite different than in all other species examined. The taxonomic significance of asymmetrical or symmetrical aedeagus and shape of spermathecal ductus must be cleared. Beside the colour, there are no other external differences between *colae* and *bicolor*. Furthermore, numerous species lack a conspicuous sexual dimorphism at all. At present, however, the suggested grouping of the species appears helpful, and it is left to further work to extent such a treatment to the species not dealt with here or to find better characters. Also, it needs to await further data to judge which genera of the *Gabonia*-complex are justified ones. The generic classification of these halticine beetles, as elaborated by Jacoby (1895, 1899) and Weise (1895), needs to be reassessed and, perhaps, the association of species to PAs might turn out to be an important ecological character for taxonomic considerations. However, finding *G. compressicornis* at *Vangueria* but not (yet?) at PA-sources appears to contradict the idea of PA association to be a reliable generic feature. Furthermore, the equal attraction of both sexes of *Nzerekorena filicornis* is different to *Gabonia*, but baiting in further habitats and in different seasons are required before discussing such aspects.

Thus, a lot of more information has to be gathered in this genus; we hope to find the hostplant(s) at least of one or the other species, to be able to study the behaviour in some detail, and we shall accumulate as much information as possible to eventually result in a cladistic analysis.

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